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ORIGINAL COMMUNICATIONS.

THE EXPERIENCE OF FORTY-TWO CASES OF GOITRE TREATED BY OPERATION.

By A. MARMADUKE SHEILD, M.B., F.R.C.S., *Surgeon to, and Surgeon in Charge of the Throat Department of, St. George's Hospital, London.*

(PLATES I. AND II.)

A CONSIDERABLE number of patients suffering from goitre have come under my care during the last fifteen years, and as their history and treatment is full of interest, I have thought it worth while to embody the results of my experience in a brief communication. Forty-two cases have been submitted to some form of operative procedure, and a smaller number have had medicinal and climatic treatment. The patients have come from the most varied localities. We will consider the latter class first. The medicinal treatment generally adopted has been the administration of iodide of potassium, with tincture of iodine, in the proportion of 3 grs. of the former with 1 minim of the latter. I have increased the dose of the tincture to 3 minims, but have never gone beyond this limit. The usual vehicle has been infusion of gentian, and the mixture has always been administered in a glass of water after meals. These large doses of iodine want careful watching, and should marked signs of iodism, or especially anæmia and weakness, supervene, the remedy must be discontinued. The thyroid extract, pushed to full doses, has also given good results in my hands, and I am quite unable at present to say what cases are benefited by iodine and what by thyroid extract. In one case only have I tried the hydriodic acid in the form of Gardner's syrup, and I found it answered well. The remedy is certainly worthy of a more extended trial. I have usually sent private patients to the East Coast, and I feel sure that sea air is a most important adjunct to the iodine treatment. I am aware that it is customary to minimise the influence of drugs upon this affection. The evidence of my own experience, however, renders me able to assert that small goitres may entirely disappear under this treatment, and the symptoms of large and formidable goitres may be counteracted. A striking instance of therapeutical treatment is as follows:—

Case 1.—In 1900 I saw a stout, puffy lady, æt. 70, who had a truly enormous and lobulated goitre, extending from the chin to the sternum, and laterally nearly as high as the auricles; it was as though the thorax and abdomen sloped straight up to the chin. She had borne this great tumour for at least forty years, and had resided principally in tropical countries. This lady had a feebly acting heart, but no albuminuria. The face was dusky and congested, and there was slight inspiratory stridor. The great irregular masses of growth did not move freely upon the deeper parts of the neck, and the integument was covered with an intricate plexus of enormous veins. Notwithstanding the size and serious connections of this growth, this lady had been able to lead an active life, but on residing in London she at once commenced to experience respiratory troubles of a "bronchitic nature." As instancing the operative enterprise now prevalent in the metropolis, she had been advised to have this tumour removed without delay, and was assured that no risk to life would occur, an opinion with which I strongly and emphatically disagreed. This patient took the iodine and iodide of potassium mixture for two months, with marked benefit. The growth reduced considerably, and at the end of three months the skin of the neck hung in wrinkled folds where before it was dusky and congested.

Residence on the East Coast has also been of marked benefit to her. Considerable cardiac and bodily weakness followed the prolonged administration of iodine, and this was relieved by the administration of small doses of digitalis. She is now quite comfortable, and any operative measures, at her advanced age, are, in my judgment, to be shunned.

I have little belief in the efficacy of local measures, and the injections of iodine or perchloride of iron into parenchymatous goitres I have never advocated. Any local inflammatory action set up by these agents most seriously prejudices the chances of the patient in any needful subsequent operative proceedings. The same objections do not apply to the external application of the red iodide of mercury ointment, though, personally, I have not seen much benefit arise from its employment.

In a considerable number of cases of goitre, such treatment quite fails to check the growth of the tumours or diminish their size, and operative treatment has to be adopted. And here the family practitioner, who especially deals with these cases in their early beginnings, is placed under a heavy responsibility, which cannot be ignored. A study of the cases presently to be related conclusively shows that the operative treatment of goitres as yet small, and especially if yet mobile, is, if properly carried out, free from any special risk; mobility on the deep parts of the neck is the principal guide to the comparative risks of the operation; operations upon goitres of enormous size, of long growth, and extensive deep connections, are perilous in the extreme, even with all skill and experience in operating. Of the forty-two cases, in only six could I distinctly make out the presence of adenomatous tumours, which are certainly more exceptional than one might suppose. In three, small cysts were discovered. In two cases very large cysts existed. They filled the side of the neck, nearly from the jaw to the clavicle. One operation was for exophthalmic goitre. It was performed for reasons of respiratory difficulty. There was one fatality from hæmorrhage in a tumour of enormous size, which was showing carcinomatous change, and associated with secondary growths in other parts. In one advanced case the operation of removal of one lobe was abandoned, because of extensive implication of the carotid sheath, the subclavian vein and pleura, in a huge mass of growth which extended below the level of the clavicle. The remaining cases were simple parenchymatous goitres. Some of them were of great size, but they all had the common feature of mobility, and their removal was effected with comparative ease. In no case did sepsis occur, immediate union being the general result.

First as to the adenomatous tumours. The majority of these were in the isthmus of the thyroid gland, and were detected by their marked mobility, rolling about under the examining hand. They were removed by a free straight incision, the capsule of the gland was incised over them, and they were shelled out. In one case very free and persistent hæmorrhage occurred from the cavity, but this was finally arrested by plugging with a fine strip of iodiform gauze soaked in turpentine. I have also seen veins of great size coming across the front of the thyroid, over the capsule of the adenomatous tumours. These have been secured by "dipping" under them a fine curved needle threaded with fine catgut. I may also draw attention to the fact that the diagnosis of thyroid adenomata from cysts is very difficult, if not impossible, and that grave consequences may result from cutting into goitres for the enucleation of supposed adenomatous tumours which do not exist. I have witnessed one fatality from repeated hæmorrhage from this error, but the case did not occur in my own practice. The patient, a girl æt. about 20, finally had the affected lobe removed *in toto*, but she had suffered repeated bleedings from the previous erroneous incision, and was too weak to bear the additional strain of the second operation.

In my own judgment, no supposed adenomata of the thyroid gland should be cut down upon, unless they can be distinguished as mobile rounded tumours, quite distinct from the gland substance in which they are embedded, and the question of serious hæmorrhage from large vessels in the capsule is always a possibility.

The cysts of small size have been treated by opening, painting with carbolic acid, and stuffing with iodoform gauze. Here again trouble may arise from hæmorrhage. One of the cysts I opened was no larger than a small walnut, yet it contained venous blood, and the flow from it was with difficulty arrested by plugging with turpentine gauze, and digital pressure with a sponge. I may remark here that digital pressure is of considerable value in these cases, and will generally succeed, if patiently applied, in checking the bleeding.

The two examples of large cyst are of great interest, and as they both were very similar in their course and symptoms and treatment, the relation of one of them will suffice as an illustration of the difficulties which surround these cases.

Case 2.—A married woman, æt. 42, was under my care in 1889, suffering from a huge cyst of the neck, obviously connected with the thyroid gland. This formation was oval. It occupied the left side of the neck from the level of the hyoid bone nearly to the cheek, and moved freely when the patient swallowed. The history was vague, but the swelling had certainly existed over ten years. It had once, some six years ago, been tapped, and nothing but blood escaped. Of late it had increased in size remarkably, and caused much respiratory trouble, with difficulty in swallowing also.

The cyst was very adherent to the tissues of the neck; from its long standing and fixation, I felt that an operation to remove it *in toto* would be very difficult and perilous. Inflammatory changes had doubtless occurred in its walls, and this would incorporate the cyst with the sheath of the vessels and other important structures. The following operation was therefore performed:—An incision about 2 in. in length was made over the lower part, which exposed the dark-coloured wall of the cyst covered with enormous veins. A fine aspirator needle was introduced between the veins, and it was discovered that the contained fluid was straw-coloured serum, containing cholesterin in great abundance. The veins were clamped, and a free incision made into the cyst, about 8 oz. of fluid being evacuated. The edges of the sac were sewn to the skin and a large tube inserted. I was prepared for long and tedious treatment in this case, and I had also spoken to the patient on this point, but I was hardly fully aware of what would actually occur. To summarise the results, the treatment lasted nearly eighteen months. Several attacks of severe inflammation of the cyst occurred, and large pieces of membrane and calcareous material came away through the opening from time to time. The neck was dressed with iodoform gauze, and washed out regularly through the tube with iodine and water. All this time I could see, month by month, that the cyst was shrinking, and I encouraged the patient to hope for an ultimate cure, which was indeed effected. The last step in the treatment was to burn an obstinate sinus which resulted with a fine galvano-cautery. Two years afterwards, this great cyst had become entirely obliterated, and the only sign of its previous existence to be ascertained was a slight thickening at the side of the neck, and a faint puckered scar. I was much struck with the trouble and care which this case necessitated, and only the conviction that removal would be very perilous induced me to recommend it. The absence of scarring or deformity of the neck in the final result was, however, very striking and gratifying. The second case of large cyst ran much the same course, but was cured in about nine months. Calcareous material and pieces of cyst wall came away from time to time in much the same manner. The result was perfect, a faint, small scar only resulting.

Operations for exophthalmic goitre upon the gland itself have not found much favour. The patients are anæmic, and their anæmia, mental state, and cardiac conditions are not very favourable to the performance of severe operations. My experience has been limited to one case, where the enlarged isthmus and lobe of one side (the right) caused respiratory trouble:—

Case 3.—An anæmic single lady, æt. 32, was sent me by Dr. Boake, of Ilminster, suffering from slight exophthalmos and a troublesome cough, associated with marked inspiratory stridor. Her thyroid gland had been noticed enlarging for two years, and all the signs of Graves' disease were well marked, especially the emotional symptoms. The right lobe of the thyroid body was the size of a small lemon, and was parenchymatous in nature. A loud bruit could be heard over it, and over the vessels of the neck. I removed this lobe and part of the isthmus of the gland in the usual manner, and no great difficulties were encountered in the operation itself. Chloroform was the anæsthetic administered. After the operation a very uncomfortable complication arose, namely, urgent vomiting, which grew worse and worse despite all remedies. She would "retch" violently at the slightest sound or touch. This caused some hæmorrhage from the wound, and the sutures had to be removed. This serious sickness lasted for two days. The temperature was never above 100°, but the pulse was exceedingly quick. Rectal feeding was resorted to, and bromides were administered per rectum. On the morning of the second day I applied a powerful blister to the epigastrium over a surface the size of the palm of one's hand, and sprinkled the raw surface with a powder of $\frac{1}{2}$ gr. of morphia. This acted immediately, and the sickness ceased. But it gave great anxiety in such a case, as may be imagined. The further progress was very satisfactory. The wound healed, and the remainder of the growth rapidly shrivelled up. All her symptoms disappeared, and two years afterwards she was in perfect health. There can be no question in this case that marked improvement in the constitutional state followed the removal of the growth.

It would be well next to relate the one fatal case which has occurred in my series, for it well illustrates the inevitable risks attending operations on large and neglected growths:—

Case 4.—A woman, æt. 43, had suffered from goitre for over twenty years. Of late the growth had increased rapidly, and caused such serious dyspnœa that she could hardly lie down. The tumours were of excessive size, and hung down over the front of the sternum (Plate I.). The neck measured 22 in. round in the widest part. Enormous venous sinuses were everywhere visible, and a loud bruit could be heard over the tumour. All kinds of medicinal treatment had been employed without avail. In both breasts, and in the side of the thorax, were numerous small tumours, about the size of nuts, hard, movable, and insensitive. These had all appeared within six months, coincidently with the increased growth of the thyroid tumours. One could hardly doubt but that they were of the peculiar nature of secondary carcinomatous thyroid growths, to which several writers have drawn attention.[1] This opinion was strengthened by the rapid increase of the thyroidal tumours, and some hard masses which could be felt. The great tumours were also very fixed upon the tissues of the neck. I had decided to remove one of the "secondary" breast tumours for examination with the microscope, when the patient was "taken" with an alarming attack of dyspnœa, and this did not entirely pass off, respiratory stridor being constantly present. It was obvious that the case was a desperate one, and the plate shows that tracheotomy would have been hardly feasible. I accordingly determined to remove the right lobe and central isthmus, though I was quite cognisant of the grave risks of such an undertaking. A very free curved incision was made, and, by dint of careful dissection and clamping of numerous veins, all at first went well. The pedicles, thick, "fleshy," and full of enormous vessels, were satisfactorily isolated, after section of the sterno-mastoid, and I was, with elaborate care, separating the mass from the jugular region posteriorly, when profuse and uncontrollable venous bleeding occurred, with that sudden and fierce vehemence which is only seen in these most embarrassing cases. Realising that the only hope was at once to reach the site of this mischief, I at once clamped and divided the pedicles and turned the mass over to the middle line. The source of bleeding was an enormous sinus, as thick as one's thumb, which led directly into a dilated and pouched jugular vein. It was at once caught and clamped close to the parent trunk, but the patient lay in a pool of blood, and was obviously moribund. Removal was effected as soon as possible, the mass being stripped towards the middle line. Again profuse hæmorrhage took place from some large venous sinuses, which apparently passed from between the trachea and œsophagus into the growth. Transfusion, warmth, and all other measures to combat the collapse were employed, but the patient never well rallied, and died about seven hours after the onset of the bleeding.

There can be no question that the patient died of hæmorrhage; still, had I the case to treat again, I do not know that I could have proceeded with greater caution or operated more thoroughly and carefully. The growth was very vascular. It was a parenchymatous goitre, developing in some situations carcinomatous change. Unfortunately, permission to examine subsequently the tumours in the mammæ was refused. This case well illustrates the risks run, and the dangers to be encountered, in removing an enormous old goitre undergoing cancerous change. It is perhaps right to say that these operations should not be attempted, yet it is hard to see patients die unrelieved from pressure on the trachea, without an attempt being made to save them. In this case tracheotomy would have been quite out of the question, on account of the bulk of the growth lying in front of the air passages, right down to the sternum. I have thought it right to relate this case in full, for our failures teach us more than our successes, and a long series of successful cases is only too apt to cultivate a belief in the minds of the inexperienced that such operations are safe and easy.

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[1] Henry Morris, *Trans. Path. Soc. London*, vol. xxxi. p. 268; *Arch. Surg.*, London, vol. xi. No. 43, p. 227.

It would be well at this point to insert the account of an equally formidable case, where the operation of removal was abandoned, I believe wisely, and the minor proceeding of ligature of the thyroid arteries carried out. This operation was unavailing in checking the growth of the mass:—

Case 5.—A delicate girl, æt. 20, had suffered from goitre for fifteen years. Her mother and one sister were similarly affected. The patient and her affected relatives live at Liss, in Hampshire, while four other healthy sisters reside in other parts. The swelling has varied in size, but has, on the whole, increased steadily, with aching pain, and it has occasioned fits of difficulty in breathing in the last few years. Her condition on admission into St. George's Hospital, in January 1901, was as follows:—A large globular tumour occupied the left side of the neck (mainly), extending from the jaw to the clavicle. It extended as far back as the trapezius on the left side, and over to the border of the right sterno-mastoid. There was no exophthalmos or bruit. The swelling, which was covered by enormous veins, measured 18 in. in circumference at the widest part. The heart's action was quick, but no bruit was to be heard. There were signs of tuberculous affection at the right pulmonary apex, and the patient had had the right knee excised for tuberculous disease a year previously. Bony union had resulted. The general aspect of the patient was that of a weakly anæmic girl, very unfitted for severe operative proceedings.

The operation was done on January 28, 1901. A very free curved incision was made on the left side, from the angle of the jaw to the clavicle, and along that bone to the sternum. The sterno-mastoid and sterno-hyoid and sterno-thyroid muscles were flattened out over the tumour; they were freely divided, and the fascial capsules also, so that the tumour became markedly prominent, and its limits could be defined. The superior pedicle could be isolated, but formidable difficulties presented in other quarters. The carotid sheath was absolutely incorporated with the tumour, and the latter could not be shelled away from the vein in the usual manner. The mass also descended under the clavicle, so that it was impossible to isolate and define the lower pedicle. The tumour was covered with enormous sinuses, any one of which, if injured, would have given rise to uncontrollable hæmorhage. The situation was clear. Had I persevered in removal, there can be no question but that I could have got the tumour away. There could be equally no question that fatal hæmorrhage might readily occur; it seemed to me that there was hardly a chance for her survival. The anæsthetist concurred, and expressed the opinion that the patient was already very collapsed. Under these circumstances, I tied the superior pedicle with kangaroo tendon, and closed the wound. The patient was collapsed and sick for a few days, but all went well, the extensive incisions rapidly healing. She went to Wimbledon, and returned in March. The tumour had increased in size, though her general health seemed better. There was now no respiratory difficulty; ultimately the growth decreased in size, under the syrup of hydriodic acid.

The operative treatment in the majority of cases has been the removal of one lobe of the affected gland, with part of the isthmus. I have kept careful notes of the after history of most of the cases, and atrophy of the remaining lobe occurred practically constantly. In two cases out of thirty, the atrophy did not occur, but the remaining lobe (right) steadily increased in size, and secondary operations were performed for its removal. Under these circumstances, a portion of gland the size of a Tangerine orange was left attached to the lower pedicle. The atrophy of the remaining lobe was sometimes very rapid, sometimes slow, but at the end of six months, even large and unsightly tumours had so reduced, that the appearance of the neck was not peculiar or very noticeable. It may therefore be confidently asserted, that removal of one lobe and part of the isthmus is an operation attended in the vast majority of cases with successful results, and a description of the operation I usually employ may be usefully inserted.

The more mobile the growth, the easier the removal. Size makes small difference. The cases which are perilous are goitres of many years' standing, which become incorporated with the carotid sheath. In many of these cases iodine or iron injections have been employed, and the resulting inflammatory adhesions render the removal difficult and perilous in the extreme.

The operation I employ may be considered under various headings:—

1. *The question of the anæsthetic.*—This is a most vital matter. In large goitres, with inspiratory stridor, any general anæsthetic is associated with risk. In such cases the choice will lie between local anæsthesia with eucaine, and the cautious administration of chloroform or the A.C.E. mixture. There can be no doubt that the former method is the safer, but there are obvious objections to it in practice, and I have hitherto never employed it. In all my cases chloroform or a mixture has been given, mixed with a plentiful supply of air.

2. *Full aseptic precautions must be employed.*—A number of ligatures of very fine silk and catgut must be prepared, and I have used kangaroo tendon for the ligature of the pedicles, with unusually good results. In no single instance has the substance given trouble in the way of extrusion afterwards. It has been prepared by careful cleaning in hot water, and the simple retention in a solution of 1 in 10 carbolic acid for a month prior to use.

3. *The incision must be free; the larger the growth the more*

extensive the incision.—To attempt these operations through small incisions is to court disaster. The incision should run along the anterior border of the sterno-mastoid to the clavicle, and along that bone as far as the episternal notch. The large flap thus formed should be turned forward, and should include the skin, fascia, and platysma. The anterior jugular or other veins should be divided between ligatures. The next essential step is the proper exposure of the tumour. It is covered by the expanded and thinned sterno-hyoid and sterno-thyroid muscles, which may well be said to form a muscular capsule. Beneath these is a capsule of fascia, which is often mistaken by the inexperienced for the true capsule of the gland. If this error be made, the operator will work outside the capsule, and the isolation of the tumour will be difficult or impossible. Where the growths are large, I invariably divide the sterno-mastoid about its centre, and tie the external jugular vein, should it present. The division of this muscle allows the tumour to come forward from the carotid sheath, and I regard it as an essential step to the safety of the operation. The stripping of the capsule should be done with the forefinger, cautiously worked along the surface of the great tumour. Next comes the isolation of the pedicles. This is again done by the finger, aided by a blunt dissector, and the operator should proceed carefully and patiently until he can definitely " hook up " the pedicles of the gland upon his finger. In the same way the separation from the internal jugular vein is conducted posteriorly. This vessel may be of huge size, and is readily torn if adherent or involved, and with the separation of the tumour from it the main anxiety of the case is at an end. The pedicles are now clamped. The operator should place the clamp on the lower pedicle, so as to include some glandular substance. This does away with the fear of injuring the recurrent nerve. The pedicles are now divided, and the profuse gush of blood which occurs may be regarded with equanimity, for it comes from the tumour, not the general circulation. The mass is now turned over toward the middle line. It will be found adherent to the side of the trachea and larynx, but can be boldly separated. Here some large adventitious veins may be found; but as the wound is so large and open, they can usually be readily clamped with curved pressure forceps.

The excellent diagram (Plate II.) by my friend Mr. Mommery well shows the steps of the operation hitherto described. The clamps are seen upon the divided pedicles, and the large cut vessels are depicted upon the divided surfaces, beyond the clamps. The tumour is seen turned over towards the median line. The divided sterno-mastoid is depicted, and the jugular vein is exposed at the bottom of the wound. This is all as actually seen, and describes better than words the actual condition of the parts.

I next engage the mass of gland tissue near the isthmus in a powerful clamp, and gradually close it, crushing the gland tissue, and the mass is cut away on the distal side of the instrument. At this period of the operation the anæsthetist must act with peculiar caution. Great "faintness" and collapse are very apt to supervene, and I have known the respiration temporarily cease at this stage. I am not sure of the cause of these symptoms. Obviously, there are several explanations which suggest themselves, such as crushing of nerve trunks, or the forcing of "thyroid juice" into the circulation. Hence, towards this stage, the anæsthetic should be so managed that the patient is not "deeply under," and corneal reflex should always be present. Enemata of warm water may be administered, and it is customary to inject strychnine, though I doubt if this is really needful. The final securing of the mass of gland tissue near the isthmus is effected by transfixing with a pedicle needle, threaded with kangaroo tendon. The ligature is strongly tightened as the clamp is removed, and the crushed tissue readily gives way, a neat and secure pedicle being thus formed.

The cut sterno-mastoid muscle is now united with fine slips of kangaroo tendon. It readily unites. A large tube is introduced, and brought out at the lower angle of the wound. The margins of the incisions are carefully sutured with fishing gut and horse-hair. In the first twenty-four hours profuse oozing occurs from the tube, saturating the dressings, which need frequent changing. The tube should be shortened inch by inch, and may finally be removed on the fifth day. I have found distinct benefit from this prolonged drainage, and I strongly advise it. All my cases have healed speedily without fever. The resulting scar, red and unsightly at first, becomes wonderfully inconspicuous as time advances, and the skin shrinks, a faint white, curved line being the only representative of the extensive incisions at the time of operation.

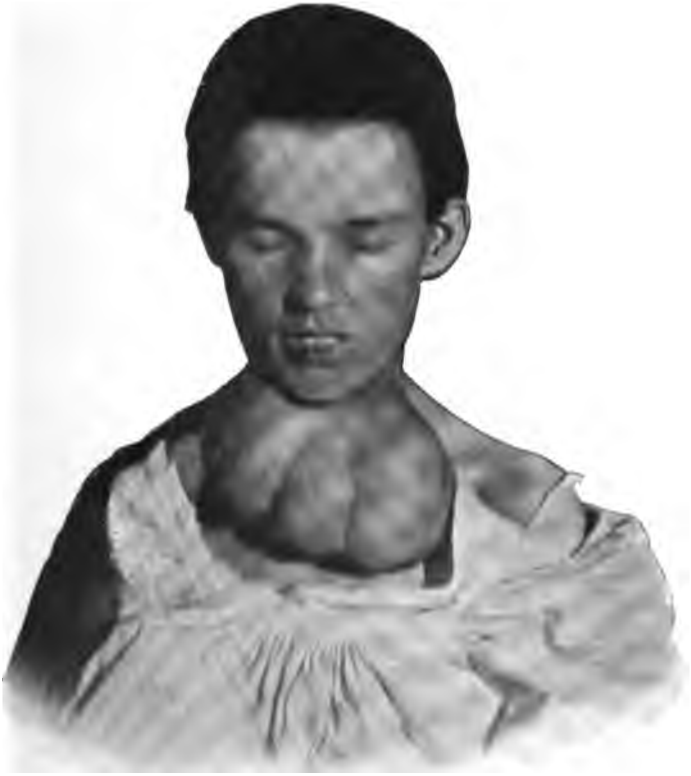
Some useful conclusions can be drawn from the above cases and considerations :—

1. That medical treatment should not be neglected in cases of goitre.

2. That cases of goitre which tend progressively to increase should always be submitted to operation before they grow to a huge size, and before their deep connections become complicated.

3. That the operation of removal of one lobe and the isthmus is practically always followed by atrophy of the corresponding lobe. The operation is free from special risk, if done properly, and with the assistance of an experienced anæsthetist.

4. That large old adherent goitres will still remain difficult and dangerous to remove, and that it is the duty of every practitioner to urge this upon his patients, and submit them to operation while removal is yet comparatively safe and easy.



A goitre of many years' standing, in which carcinomatous change had occurred, and in which the operation proved fatal.

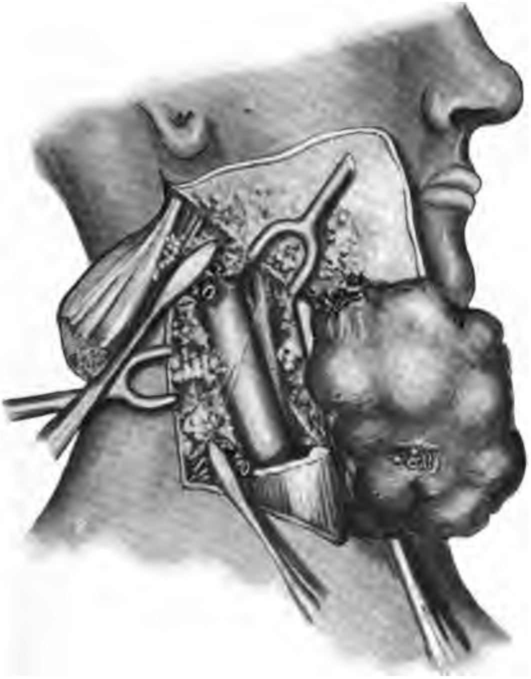


Diagram of operation for removal of a large goitre. The pedicles containing large vessels are seen clasped. The sterno-mastoid is divided and turned aside, exposing the jugular vein. It now only remains to clamp the isthmus and remove the mass.

THE CAPILLARY REFLUX AND WHAT WE LEARN BY OBSERVING IT.

By Alexander Haig, M.A., M.D. (Oxon.), F.R.C.P., *Physician to the Metropolitan Hospital, and the Royal Hospital for Children and Women, London.*

It is just eighteen years since I got the first clue to the fact that uric acid controls the capillary circulation of the whole body, and through this capillary circulation conditions blood pressure, the action of the heart, and a host of minor physiological and pathological effects. This clue was the observation that the headaches, from which I had suffered all my life, at once improved when I diminished the animal flesh on which I then lived to a large extent. I now know that the flesh contained uric acid which it introduced into my body and eventually into my blood, that the uric acid in the blood blocked the capillaries, that blocked capillaries in front with a strong heart behind meant high blood pressure, and that the headache was the mechanical effect of the high blood pressure; that the cause (the uric acid) being removed the effect (the headache) ceases to manifest, and that this result has been demonstrated in scores and scores of my fellow-sufferers.

The uric acid headache was thus the origin of my research, and furnishes to-day an epitome of cause and effect which is complete in itself. But in the investigation of this headache I have found out that the effect of uric acid on the capillary circulation varies from hour to hour throughout life, that this effect is universal and can be easily measured, and that this measurement gives results which are of enormous interest and importance for many clinical purposes, and I propose to treat of some of these to-day.

The capillary reflux is the flowing back or reflux of the blood into the capillaries of a portion of surface skin rendered anæmic by pressure, and the rate of this reflux is a measure of the quantity of uric acid in the blood, because the uric acid controls the capillary circulation.

The facts which led me up to this observation I have already given elsewhere.[1] I shall merely give here the methods of measurement I have been gradually led to adopt.

It is required to apply to a known surface, a known pressure for a definite time, and to measure very accurately the time which the blood and colour take to make a complete return into the anæmic area.

Surface and pressure are measured by means of an instrument, the capillary dynamometer, which is simply an inverted spring balance. Pressure is measured in ounces by the compression of the spring, and the surface is kept constant, namely, that of the button at the end of the plunger. Time is measured roughly by the second-hand of a watch, or more accurately by a metronome beating say half seconds, or 120 to the minute. Thus 10- or 15-oz. pressure can be applied through the button of the capillary dynamometer to a surface on the back of the hand for 6 half seconds by the metronome, and the time of the reflux recorded by the same instrument.

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[1] "Uric Acid as a Factor in the Causation of Disease," 5th edition; *Brit. Med. Journ.*, London, 1899, vol. ii.

It is necessary that the hand should be about the ordinary temperature of the body, as cold diminishes the solubility of uric acid in the blood stream, and thus increases the precipitation of the colloid that blocks the capillaries and slows the reflux. Heat, on the other hand, increases the solubility of uric acid in the blood stream, diminishes the colloid blocking of capillaries, and quickens the reflux.

Again, the hand should be at or about the level of the heart, for the greater the column of blood above the anæmic area the quicker will be the reflux; in the same way, a tight sleeve or a band round the arm, or, in pathology, a thrombus in a vein, will cause serious congestion and quicken the influx on the distal side of the obstruction.

When the patient is horizontal in bed, the best plan is to take the reflux on the front of the chest where we have the level of the heart, and the average or normal body temperature. The greater the pressure, and the longer the time during which it is applied, the slower the reflux; and it is therefore necessary to use a constant time and pressure, and the figures I am going to show were all obtained with 15-oz. pressure, applied for 6 half seconds.

Now the quantity of uric acid in the blood varies in every one from morning to evening, being greater in the morning from 5 or 6 A.M. up to 1 or 2 P.M., and less in the evening, especially from 7 or 8 P.M. up to midnight or 1 or 2 A.M. And the quantity of uric acid in the urine and the number of granules in the blood varies in exactly the same way.[1] Therefore the capillary reflux is slower in the morning and quicker in the evening in every one.

Fig. 1 shows a few ordinary diurnal fluctuations in myself; but the same curves or similar ones are seen in every one, in physiological conditions, who sleeps and feeds at the ordinary hours. For the diurnal fluctuations of uric acid in the blood and urine are dependent on the effects of meals on the alkalinity of the blood, as this controls the solubility of uric acid.

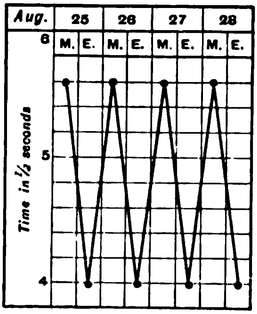

Fig. 1.

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[1] *Op. cit.*, pp. 91–95.

This is part of a continuous curve which I keep up constantly throughout the year, and which shows fluctuations due to cold and heat, exercise and fatigue, alterations of food, drugs, and other things; but I have purposely selected a part where there was no fluctuation, and a time of year when the difference of external temperature between night and morning was as small as possible, so that the direct effects of the uric acid should be but little interfered with. In this figure we see that my capillary reflux is in the morning between 5 and 6 half seconds, and in the evening about 4 half seconds, and I may say that each of these points represents the result of three or four observations, of which the mean is taken.

Blood pressure shows exactly similar fluctuations as may be seen in the curves previously referred to, and if the condition of the heart is known to be physiological, the blood pressure can be inferred with considerable accuracy from the capillary reflux. Thus my blood pressure is commonly 120 mm. of Hg in the morning, and 100 mm. in the evening; therefore a blood pressure of 120 corresponds to a capillary reflux of 5–6 half seconds, and a blood pressure of 100 to a reflux of 4 half seconds; or, shortly, B. P. 100 corresponds to C. R. 4.

If, now, we go into pathology, we find the following:—

Fever	C. R.,	2–3;	B. P.	70– 80
Bright's disease . .	,,	10–12;	,,	170–180
Physiology, morning .	,,	5–6;	,,	120–130
,, evening .	,,	3–4;	,,	100

And with such figures in front of us, we can often tell pretty closely what the blood pressure is from the capillary reflux. Almost the only important exception to this is in cardiac debility, either some forms of morbus cordis, or mere weakness, as after fevers, for here *vis a tergo* is wanting and the reflux will be slow out of proportion to the uric acid present in the blood.

Thus, to give an actual instance, I found C. R. 7–8 and B. P. 100-110 in a case of slight mitral regurgitation, and in severe morbus cordis the altered circulation in the lungs interferes with the oxygenation of the blood, and so increases its alkalinity and the amount of uric acid it will contain; and so in morbus cordis you get slow reflux and raised blood pressure; but, as a rule, the pressure is not so high as the slowing of the reflux would seem to indicate—thus a B. P. of 140 would go with C. R. 10–12. When in morbus cordis the heart finally fails, C. R. remains very slow, while B. P. falls to 90 or 100, or lower. In the case of mitral regurgitation mentioned above, the slight lesion had been in existence for years, and the pulmonary circulation had more or less adjusted itself to it.

I am not in this paper dealing with pathology, but will just say here that its large fluctuations such as the C. R. of fever, 2–3 half seconds, as compared with that of Bright's disease, 10–12 half seconds, can be recognised by any one by a touch with the point of the finger without careful measurement of time or force, and among out-patients a touch at once suffices to distinguish such cases.

There is one exception to the rule that fever goes with quick capillary reflux which it is as well to remember, and it is also interesting and instructive. The capillary reflux is quick in fever because the blood is cleared of uric acid, and in accordance with this we find that the excretion of uric acid in the urine is scanty and the granules in the blood few. But the blood is cleared of uric acid in fever because its alkalinity is diminished, and there is one condition under which fever cannot diminish the alkalinity of the blood, for diminished alkalinity is due to increased oxidation; but when oxygen is deficient, increased oxidation is not possible. Therefore, in fever with dyspnœa the blood is not cleared of uric acid, the reflux is not quickened, and the blood pressure is not reduced, the uric acid is not diminished in the urine, and the granules are not scanty in the blood.

What we have to remember is, that a slow reflux excludes fever, *except in cases where there is dyspnœa or cyanosis* with deficient oxygenation of the blood. That there is fever at all shows that there is some increase of metabolism; but the fever is much less relatively to the local lesion, than it would be, if the blood was freely oxygenated.

Fig. 2 shows the effect of exposure to cold in the morning hours, and the common effect of exposure to cold is to raise the acidity of the urine and diminish the alkalinity of the blood; and the result of this is, that a certain amount of uric acid that would have passed through the blood in the morning hours, and been excreted in the urine, was driven out of the blood and retained in the body, instead of being excreted. The uric acid thus held back came again into the blood on the evening of the day of exposure and during the following day, adding itself on to the uric acid then naturally in the blood. The result is that with an increase of uric acid in the blood the capillary reflux is slowed, the blood pressure is raised, and there is a threatening of headache.

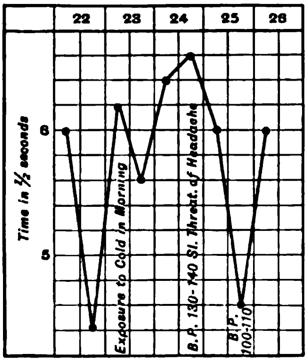

FIG. 2.

On 22nd, the reflux is practically normal, being 6 in the morning and between 4 and 5 in the evening. On the 23rd, there is exposure to cold in a cold station and train for two or three hours, natural warmth not being completely restored for some hours more; and all the abnormal refluxes on the evening of 23rd and the morning and evening of 24th are the result of this.

The exposure does not show in the morning of 23rd, for that result was obtained before the exposure; but the retained uric acid had begun to return into the blood in the evening, so that C. R. was between 5 and 6 instead of between 4 and 5, and the uric acid was still causing some excess in the blood in both the morning and evening of the next day (24th).

On the evening of 24th, as there was a slight threatening of high blood pressure or uric acid headache, the blood pressure was taken and found to be between 130 and 140 mm. of Hg.

On the 25th the fluctuation came to an end, and the curve returned towards normal, and the blood pressure measured on this evening was found to be from 100 to 110 mm.

It will be noted that the uric acid which only took some six hours to be retained required some twenty-four to thirty-six hours to pass out; but the retention took place in the morning hours when the excretion is at its maximum,[1] and the retentive effect will thus be greatest; and, besides, once uric acid gets into the blood it depresses metabolism and the fires of life, and with the fire (oxygenation) the acidity; hence it tends to bring more uric acid into the blood from other available sources; thus it comes about that those who have their tissues full of uric acid from years of wrong diet, and who unfortunately get depression and collæmia after a fever, may have an almost constant collæmia holding them down for weeks and months with slow capillary reflux, subnormal temperature, and depression of mind, body, and metabolism, because a large quantity of uric acid is available, and a large amount of it is brought through the blood. For a full explanation of this and of the action of cold in Fig. 2, I must refer to "Uric Acid," as there is no space to go into it here.

Fever produces a fluctuation similar, only much larger than that shown in this figure, the quick capillary reflux of the fever showing the retention, and the slow reflux after it showing the corresponding increase of excretion, and, as I have pointed out,[2] each day of quick reflux and retention in the fever is commonly followed by one day of slowed reflux and increased excretion after it.

From all this we see that the capillary reflux is a perfectly correct index of the amount of uric acid in the blood, and of the fluctuations produced in this by cold, by heat, and in pathology by fever.

In the next figure we shall see that it is also a correct index of the effects of feeding uric acid by taking foods that contain it; for of Fig. 3 it may be said that we can actually see the uric acid passing through the blood.

It is true that in this way you cannot estimate the quantity of uric acid thus swallowed, but must add the collection and estimation of the urine, as is done in "Uric Acid";[3] but when you merely want to know whether a given substance does or does not contain an appreciable quantity of uric acid, the curves of Fig. 3 are quite sufficient evidence; and from other experience I should estimate that some 3 or 4 grs. of extra uric acid passed through the blood on the evening of the 2nd and morning of 3rd in Fig. 3.

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[1] *Op. cit.*, Fig. 3.

[2] *Op. cit.* p. 496.

[3] Fig. 75.

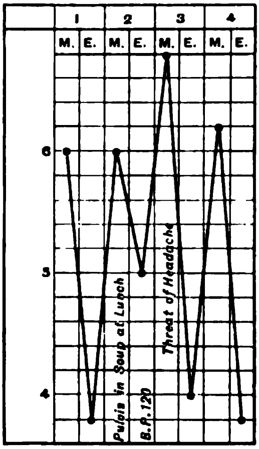

Fig. 3.

In this figure the morning and evening position of the 1st are fairly normal, though the evening reflux is somewhat quick, perhaps owing to its being taken when very warm in a warm room. On the 2nd some pulses were taken in soup at lunch, and in the evening, in spite of a very warm room, the reflux was as slow as 5, and the blood pressure, which, as it happened, was being observed for other reasons, was found to be distinctly higher than usual. During the night and morning of the 3rd, there were several signs of collæmia, including a threatening of headache, and the C. R. was nearer 7 than 6; in the evening of the 3rd and the day of the 4th it was again practically normal.

I have various curves showing similar results of feeding uric acid obtained with meat extracts, or other preparations; some of which have been asserted to contain no uric acid. It matters little what form the uric acid is in, whether xanthin or uric acid, and whether in meat, fish, eggs, pulses, tea or coffee, as all these things mentioned, as giving an increased excretion of uric acid in the urine, produce a similar fluctuation to that in Fig. 3 in the capillary reflux curve, as they pass through the blood; and any one of them may thus be seen as it passes through the blood. Then it is possible by taking observations every hour or so, instead of, as in these curves, merely morning and evening, to map out still more accurately the time during which the introduced uric acid is passing through the blood.

I shall now pass on to some of the effects of drugs, and shall first show in Fig. 4 some of the fluctuations produced in the capillary reflux by that most powerful solvent of uric acid, salicylic acid and its salts.

The corresponding fluctuations in the excretion of uric acid in the urine and the great similarity of the curves is obvious at a glance,[1] though the excretion curve ends with the great fall that follows the leaving off of the drug. And in "Uric Acid" I have also pointed out that the granules in the blood would yield a curve nearly identical with either that of the circulation (capillary reflux) or that of the excretion (uric acid in the urine). And in the reflux curve we are dealing merely with morning and evening, two points only in the twenty-four hours. In Fig. 4, on 17th, the daily fluctuation is fairly natural, though the excursion is rather large, and it had been so for some days previously, not shown in the figure, probably owing to the eating of some mushrooms; and about the 17th, the introduction of uric acid began to produce some symptoms; and so on the 18th salicylate was taken to clear it out, and this it did, as, on the evening of the 18th the reflux remained slow about half way between 5 and 6.

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[1] *Op. cit.*, Fig. 8.

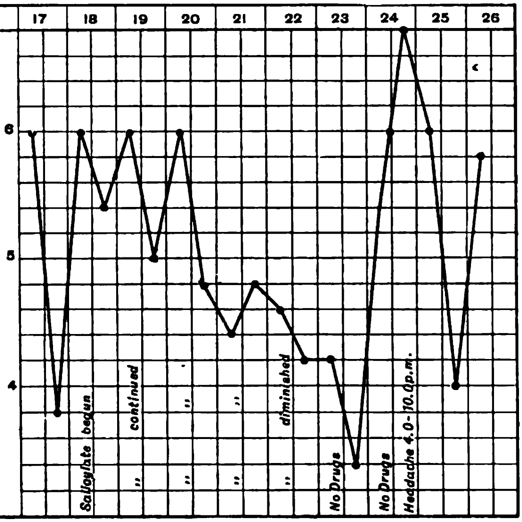

Fig. 4.

And this is one of the characteristic effects of taking a salicylate, that it does not affect the morning reflux much at first, but greatly slows the evening reflux; and this corresponds with the fact that the solvent power of a salicylate for uric acid, or its component parts, is greater in the evening, when the alkalinity of the blood is least, just as it is greatest in fever when the alkalinity of the blood is greatly diminished, and is at its least in chronic conditions of debility and asthenia when the alkalinity of the blood is not at all diminished; hence, as I have pointed out elsewhere, salicylates are most useful in acute conditions with high fever, but may be almost no use in chronic conditions with debility and failure of nutrition; in these latter conditions they are not solvents of uric acid to anything like the extent that they are so in acute fever, with diminished alkalinity of the blood.

In fact, small doses of a salicylate given in the morning may even diminish the excretion of uric acid in the urine, diminish the number of granules in the blood, and quicken the capillary reflux instead of slowing it; but the same dose given in the evening will increase the number of granules in the blood and the excretion in the urine, and slow the reflux to some extent, as seen on 18th and 19th in this figure.

On the 19th, we see the ordinary morning level, but a slowing in the evening not quite so great as on the evening of 18th; this shows that the largest excretion of uric acid on salicylate took place on the evening and night of 18th. On 20th, we have the usual morning level, but there is a quickening in the evening, showing that the available uric acid was being diminished, and there was less in the blood than at the corresponding hour of the previous evenings. On the 21st we have a very marked morning quickening, and the evening was a trifle slower than the morning; probably there was here a great falling off in the excretion of uric acid, such as is seen on day 3 of the Fig. 4 in the work previously referred to. On the 22nd, there is a slight slowing in the morning as compared with the previous morning, and it quickens in the evening, the salicylate having on this day been reduced. On the 23rd, the morning is at the same rate as the previous evening, but no drugs were taken, and in the evening there is a further decided quickening, corresponding to the great fall in excretion after the drug is left off, as seen in the above-mentioned Fig. 4 on day 7.

The great feature of the salicylate curve is, at the beginning, a marked slowing of the evening reflux, and at the end, after the great excretion of uric acid is over, a marked quickening of the morning reflux, so that it reaches evening levels. The blood granules also, as I have shown, give a similar fluctuation, having a relation to the red cells of 1–60 or 1–70 with the low excretion and quick reflux that follow the withdrawal of the drug, and a relation of 1–2 or 1–3 with the large excretion and slow evening reflux when it is first given. All the phenomena, therefore, correspond, and there is no room for doubt as to cause and effect.

On the 24th, the reflux slows very decidedly in the morning to between 5 and 6, and it is remarkable that it was slower still in the evening, and this was accompanied by high blood pressure, as there was a headache from 4 to 10 P.M.

This is a common, almost a universal result, of taking salicylate for a few days and then leaving it off; and every one who has ever suffered from uric acid or high blood pressure headache, generally has a threatening of a similar headache on the first or second day after leaving off a course of salicylate.

Its explanation is, I believe, that the very quick reflux on the evening and most of the day of the 23rd was not entirely due to the fact that all the available uric acid has been cleared out by the drug (salicylate), but that after the drug was left off there came what I have called a dead point, the urate not being in solution either with alkali or salicylate, and therefore being driven out of the blood and retained; and this retention, by absence of solvents, was followed by a rebound and a headache on the 24th, just as the similar retention by cold in Fig. 2 was followed by the same result next day. On the 25th and 26th, the curves return towards normal, and remain there with some slighter fluctuations on the following days.

In Fig. 5 we see the much less marked effect of an alkali, which is a much less powerful solvent. On the 15th, the refluxes are about normal; late on the evening of the 15th, and on the 16th and 17th, alkali is taken in the form of bicarbonate of soda and citrate of potash; and, as a result, we see a slowing of the morning refluxes and a more marked slowing of the evening ones on the 16th and 17th. On the 18th no alkali was taken, but the morning reflux is still slow as the result of that taken on the previous day. In the afternoon, or early evening, some calomel ($\frac{3}{10}$ or $\frac{4}{10}$ gr.) was taken, and partly as the result of the retention thus produced, and partly as the result of leaving off the alkali, the evening reflux quickens very decidedly. On the 19th, when no drugs were taken, the curves return nearly to normal.

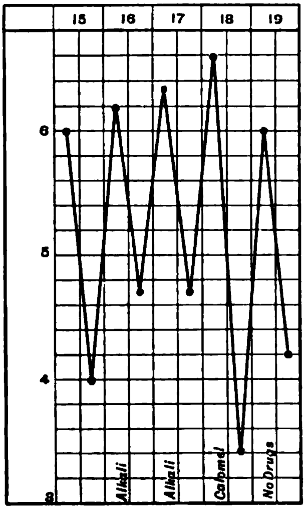

FIG. 5.

This shows how much smaller are the effects of alkali, and that it slows the morning as well as the evening reflux, while a salicylate slows the evening chiefly. The figure also shows the action of calomel, as a similar evening quickening can be produced by that drug, even without the previous administration of alkali, and a very large number of drugs will produce similar fluctuations in one direction or the other.

We see, then, that the capillary reflux furnishes, to accurate observation, a complete and trustworthy index of the quantity of uric acid in the blood, and that it does so because uric acid controls the capillary circulation of the body from the hour of birth to that of death.

Readers of my book already know that before I took to measuring the capillary reflux, I obtained similar results by measuring the duration of the fatigue image of the retina, as a guide to the circulation in that structure. They also know that the reflux is the index of the quantity of uric acid passing in the urine from hour to hour, of the number of granules to be met with in the blood, and of the blood pressure or probable blood pressure.

Those who propose to make use of the reflux as a measure of the uric acid in the blood, and of its effect on the capillary circulation and the blood pressure, would do well to devote themselves at first to the great pathological fluctuations, which are easily seen and measured, and require no instruments.

Having got confidence in the existence of these, they might proceed to produce for themselves a physiological curve, such as that in Fig. 1, measuring time by counting half seconds, which is not difficult to do, and using at first merely the point of the finger;

but for finer physiological work, as distinguished from pathological work, it is better to have instruments and to measure everything with care; and pathological work also gains in interest and value by doing so; it is easy to carry a capillary dynamometer, but a metronome is bulky; yet, as I have said, after a little practice with a metronome, it becomes easy to count half seconds with considerable accuracy.

Those who are constantly feeding uric acid in flesh and tea, etc., must not expect that their capillary circulation will yield results which are identical with those in the figures I give, and especially will they fail to get the result in Fig. 3; for only when the blood is relatively free from uric acid, and in a condition to dissolve more of this substance when presented to it, will the swallowing of 2 or 4 grs. of uric acid produce such alteration in the circulation as is there shown.

Drugs also will produce effects which are to a large extent proportional to the uric acid they meet with, and in gout or rheumatism a salicylate will change the C. R. of fever, say 2–3, to that of Bright's disease, 8–9 or 10.

For the explanation of other small points I must refer to my published writings, and will merely say in conclusion that this observation of the capillary circulation almost introduces a new sense into clinical medicine, for through it the action of various drugs and foods becomes, for the first time, visible to the eye, and can be watched from hour to hour.

THE NATURAL AND ARTIFICIAL MINERAL WATERS OF NAUHEIM: THEIR PHYSIOLOGICAL AND THERAPEUTICAL EFFECTS, AND THEIR EMPLOYMENT IN DISEASE, BY THE SCHOTT METHODS.[1]

By J. M'Gregor Robertson, M.A., M.B., F.F.P.S.G., F.R.S.E., *Glasgow.*

(*Concluded from* Vol. IX., *page* 530.)

IV. The Employment of the Waters in Disease.—If one properly understands the physiological and therapeutical actions of the Nauheim waters, there is no difficulty in determining theoretically the types of case suitable for their employment. In certain kinds of cases the clinical confirmation of the physiological and therapeutical reasoning is complete. It is because my own experience has been so uniform in this respect that I have deemed it desirable to discuss so fully the mode of action of the waters.

The conclusions of that discussion were, that the effect of the

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[1] Readers are requested to note that on page 520 of vol. ix., in the previous part of this article, the author twice states that the temperature is 91° F., whereas it should in both cases read 89° F.

Nauheim bath was, first, to produce a complete redistribution of blood, by its action upon the circulation in the skin, and, second, to slow and strengthen the heart's action. It is too often assumed that the Nauheim treatment is a heart treatment essentially and exclusively. To look upon it in this light is to deny one's self a therapeutic agent of great value in many cases where there is no cardiac complication at all. I shall try to arrange into broad classes the kinds of cases likely to benefit by the use of the waters.

1. First of all, it is necessary to remember that Nauheim is a very old bath,[1] with a reputation for the treatment of gout, rheumatism, and scrofula, and that it was in course of watching the treatment of gouty and rheumatic conditions that Beneke[2] observed and drew attention to effects upon the heart, since more carefully studied, first by Dr. August Schott, and later by his brother, the present Dr. Theodor Schott. In short, the ancient reputation of Nauheim was for treatment of diseases of general nutrition. There is little doubt that its value in these diseases depends mainly on the marked changes the baths produce in the distribution of blood and the quickening of tissue metamorphosis thereby induced. This quickened tissue metamorphosis was the subject of Beneke's earliest investigations, and in later times many observations and experiments have been made by Röhrig and Zuntz,[3] van Noorden, and others.

This derivation of blood to the skin, the unburdening of the deeper tissues and organs, and consequent general increase in the velocity of the blood flow, may produce important results. Increased diuresis is one evidence, and on merely theoretical grounds one would expect an effect on the absorbent system, and aid in the reabsorption of effusions and the removal of exudations. My own first experience of Nauheim was in an old-standing case of chronic pelvic cellulitis, a lady, whom I sent to Nauheim because of gradually increasing weakness of the heart. The pelvic condition had been of eight years' standing, and I am not sure that the improvement in the pelvic condition effected in six weeks was not more astonishing than any benefit to the heart could possibly have been. I put this class of case first, because in the greater interest of heart cases it is apt to be lost sight of. Leichtenstern[4] says: "The favourable effects of these baths [brine baths] in scrofulosis, in rachitis, in chronic exudations, and residuary effects of inflammation (in pelvo-peritonitis, perityphlitis, old pleuritic exudations, chronic joint exudations, etc.), in hyperplasia of the lymph glands, in chronic metritis, oöphoritis, prostatitis, mastitis, etc., are empirically established."

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[1] For an account of the establishment of a bath at Nauheim, see Otto Weiss, "Zur Gründung und Entwicklung des Sool-bades Nauheim," Bad-Nauheim, 1875.

[2] "On the Warm Saline Springs of Nauheim," Marburg, 1860, p. 143; "Zur Therapie des Gelenk Rheumatismus und der mit ihm verbundenen Herzkrankheiten," Berlin, 1872; "Neue Erfahrungen ueber die Wirkungen der kohlensäurehaltigen Soolthermen Nauheims bei Gelenkrheumatismus und den mit ihm verbundenen Herzkrankheiten," Berlin, 1875.

[3] "Zur Theorie der Wärmeregulirung und der Balneotherapie," *Arch. f. d. ges. Physiol.*, Bonn, 1871, Bd. iv.; Paalzow, in the same volume, has a paper on the "Effect of Skin Stimulation on Tissue Change."

[4] Von Ziemssen's "Handbook of General Therapeutics," 1885, vol. vii. p. 885.

2. The second type of case is that of muscular weakness of the heart, due to or originated by physical overstrain, or the effect of prolonged overwork, or the result of influenza, or some other similar toxic influence, or, for instance, following upon a rheumatic myocarditis,—cases of dilatation without hypertrophy and without heart lesion. This without doubt is the case that exhibits the benefits of the bath treatment to the highest degree. It is the most suitable case for treatment by the baths, and the results can be as certainly predicted as those of any other therapeutic agent.

3. The third type of case is the case of valvular disease of the heart, in which compensation has failed or has never been properly established. I have heard some critics speak, and also read criticisms, suggesting that it was claimed for Nauheim bath treatment that it could cure a valvular lesion. I have never heard such a claim made by any one who was quite familiar with the system. On the contrary, Dr. Schott drew my attention to a fact I have often since noted, that there are cases in which at first it is difficult to say whether there is a valvular lesion or not, because the energy of the heart's contractions is so feeble as not to be able to develop a distinct murmur. In such a case a course of the baths will make the valve lesion quite clear, because of the increased energy of the heart and the quickened movement of the blood. How fallacious, then, is it, in an admitted case of valvular disease, to propose to measure the benefit obtained from a bath course by a diminution in the loudness of the murmur, or to argue that no benefit had arisen because the murmur was as loud as ever.[1] So far from this being accurate, one might almost assert that the value of the treatment was proved only by the intensification, not the diminution, of the abnormal valve sound.

There is one kind of murmur which, however, without doubt disappears, and that is the murmur of inefficient valves. When dilatation is of such a kind or such a degree as to enlarge the auriculo-ventricular aperture, and so produce a murmur of incompetence in an otherwise sound valve, the bath treatment may be expected to cause its disappearance by curing the dilatation. Whenever, however, there are valvular lesions, the benefit of the treatment is to be found in the lessening of the dilatation, which aggravates the condition and tends to be progressive, and in aiding the heart, by increased action, to compensate for the incompetent valves. I venture, however, to think there is one exception to this general statement. I am inclined to believe in the possibility of the disappearance of a valve murmur, due to structural alteration of a valve. I have reason to believe this may happen in a young subject, attacked by endocarditis, provided the condition is discovered at the very outset, and provided appropriate treatment is faithfully carried out for a long time. Douglas Powell remarks that "it is common for patients to return to the hospital with a second attack of rheumatism, or for some other cause, and to then present evidence of a stenosis at the mitral orifice or an incompetence of the aortic valves, which did not exist before." He goes on to say that this is often "entirely due to premature strain put upon valves softened and impaired by inflammatory change," and by cicatricial deforming changes in them, and he urges that sufficiently prolonged rest would prevent or lessen and modify damage to the valves, and allow of complete subsidence of inflammatory change.[1] I believe a course of Nauheim baths, carried out during this period of prolonged rest, and after the disappearance of all symptoms of active disease, will do more than rest alone can do, unless it is extremely prolonged, to prevent such damage arising. I fancy, in hospital, cases are not seen early enough, and that it is very seldom the very beginning of a valve murmur is heard, its gradual development noted, and its gradual subsidence watched. But there are not infrequent opportunities in private, and in one or two such cases I believe I have assisted in the disappearance of the murmur, by a judicious use of Nauheim baths.

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[1] Lindsay Steven, "On the Nauheim (Schott) Methods of Treatment as applied to cases of Cardiac Valve Disease of Rheumatic Origin," *Glasgow Med. Journ.*, May 1896.

It is in the two classes of cases—that of simple dilatation through muscular weakness, and that of dilatation following on valvular involvement with deficient compensation, that the baths are found to produce a diminution in the size of the heart, as gauged by cardiac dulness. I suppose every one remembers the scorn with which the suggestion of such a possibility was met. To some, the idea that a few minutes' immersion in a mineral bath could cause a retraction of the cardiac walls, seemed ridiculous. But since the area of percussion dulness undoubtedly underwent alteration, all sorts of futile suggestions were made, explaining such an occurrence by a supposed increased pulmonary distension, a lowering of the diaphragm, a movement of the liver, etc. etc., induced by the bath. It was not clear to me how it was quite reasonable that the bath should perform feats of that kind, but yet be helpless to assist an unduly distended heart. The Röntgen rays have settled the question, and have shown that the all-round shrinking of the area of dulness is truly indicative of a reduction in the size of the dilated heart. There never was anything theoretically unreasonable in the view. The most deliberate utterance on this subject in a recent standard work that I am aware of is contained in Nothnagel, which I quote below.[2]

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[1] Douglas Powell, "On the Principles which govern Treatment in Disorders and Diseases of the Heart," London, 1899, p. 51.

[2] "Specielle Pathologie u. Therapie," vol. xv. part 1, Division I.; "Insufficienz

4. The fourth type of case suitable for the bath treatment is that of the cardiac neuroses. Next to the weak dilated heart, the efficacy of the treatment is most brilliantly shown in cases of vaso-motor angina, cases dependent upon arterial spasm, where there is no organic affection of the heart, but where, nevertheless, the heart is submitted to sudden and severe strain by suddenly heightened arterial resistance. In these cases the benefit is obviously due to the dilatation of the surface arterioles and the fall of the excessive blood pressure. I do not think true angina and atheromatous changes of vessels are necessarily contra-indications to the treatment, but in such cases the treatment must certainly be pursued with the greatest caution, the baths being warm, weak, short, and only very slowly strengthened.

5. In some other neuroses, such as tachycardia, exophthalmos, etc., peripheral neuritis, the bath treatment is worth considering, though its results cannot be very confidently predicted. I have seen in Nauheim a marked case of Graves' disease, in a well-known physician of Florence, undergo remarkable amelioration in a few weeks. But with the artificial baths at home I have not obtained very satisfactory results. But I have had excellent results in both of the other two affections, both in patients of my own treated in Nauheim and in Glasgow. I recall, in particular, a case of peripheral neuritis following parturition, appearing, indeed, during the puerperium, in which, after prolonged treatment by various remedies, including galvanism, the artificial Nauheim bath was adopted as a *dernier ressort* with the happiest results.

I should mention that tabetic patients are common in Nauheim, though their favourite haunt is Rehme Oeynhausen, near Hanover, where the waters are similar, though weaker.

That the baths exert a calming influence on the nervous system is clear, though what is the mechanism of its production would be difficult to say. But this I think is certain, that whereas in cases of weak dilated hearts, and in cases where the chief pathological fact is high blood pressure and arterial spasm, weak and warm baths are remarkably effective from the commencement, in irritable neurotic states the baths require to be cold, strong, and prolonged before much result is obtained.

(Schwäche) des Herzens," by Jürgensen, Vienna, 1899, p. 197.—"Der Zweck des verfahrens ist, das erweiterte Herz, welches seinen Inhalt nicht ganz auszutreiben vermag, in den Stand zu setzen sich vollständig zu entleeren. . . Die entscheidende Frage bleibt, ob sich in der That die angenommene Einwirkung auf das Herz sicher nachweisen lässt? Ist dem so, dann sind die Heilerfolge vollkommen verständlich. Für die Schott'sche Gymnastik kann ich aus eigener Erfahrung bestätigen, dass sie in kurzer Zeit eine erhebliche Verkleinerung der Herzdämpfung mit gleichzeitigem Stärkerwerden des Pulses herbeizuführen vermag. Dies ist kaum anders zu deuten als es August Schott, dem wir die Methode verdanken, that: es handelt sich um eine Entlastung des ueber die Gebühr gedehnten Herzens.

"Die unmittelbare Wirkung der Bäder auf das Herz habe ich nicht zu beobachten Gelegenheit gehabt. Allein es liegt kein Grund vor, die Angaben der Brüder Schott zu bezweifeln."

V. THE SCHOTT METHODS.—As has been incidentally pointed out, it was Beneke to whom the credit belongs of having first pointed out the benefit of the baths in cardiac conditions. But it was first August Schott, and, in association with him and after his death, his brother Theodor Schott who definitely applied the baths for the treatment of cardiac affections. I give below a note of the most important of the papers in which the details of their method were elaborated.[1]

Dr. Schott makes use of other agencies besides the baths, the saline drinking waters, for instance, but specially exercises, to which the terms *Widerstands-gymnastik*, or *Selbst-hemmungs-gymnastik*, have been applied.

These are movements of flexion and extension, abduction and adduction of single muscles, or groups of muscles, of the simplest possible kind. An operator is required; the patient makes the movement, and the operator resists it. But the feature of the process is the extreme gentleness of the resistance, and, during the movement, the patient is ordered to breathe quietly and slowly, and not by any means to hold the breath. The movements may be carried out with the patient lying, sitting, or standing, according to his cardiac taste. A single movement of flexion and extension is done, and then the patient rests for half a minute or so, then another movement, and so on. Nineteen separate movements are described, and they occupy from twenty to thirty minutes. Men may get the exercises stripped of coat and waistcoat, the upper part of their body covered with a soft shirt, or a pyjama jacket. Women should be without corsets, and wear a thin dressing-jacket. The patient has the exercises standing, if possible, with a chair by the side, to rest on between each movement, or for support when the leg movements are being done. The operator resists with the flat of the hand only, never grasping the limb. The movement is performed by the patient from beginning to end, slowly, at a uniform speed; and a properly trained operator will not permit the limb, when the movement is completed, to be dropped back to its normal position, but will see that it is carried gently back to the position of rest. The resistance is graded according to the patient, but it should slow and never quicken the pulse. The pulse is the guide both for the degree of resistance and number of movements given at each séance. Should the pulse begin to rise, the exercise is stopped. Bezley Thorne[1] gives in his book illustrations showing the method of giving the exercises. I do not think it necessary to go over these movements in detail, but will mention one or two to emphasise their simplicity.

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[1] August Schott. — "Die Wirkungen der Bäder auf das Herz," *Berl. klin. Wchnschr.*, 1880, No. 25; "Beitr. z. physikal. Diagnostik des Herzens," *Centralbl. f. d. med. Wissensch.*, Berlin, 1881, Nos. 23–26; "Die Bedeutung der Gymnastik f. Diagnose, Prognose, und Therapie der Herzkrankheiten," *Ztschr. f. Therap.* (Weiss), 1885, Nos. 20-21; "Zur Therapie der Chronischen Herzkrankheiten," *Berl. klin. Wchnschr.*, 1885, No. 33.

August u. Theodor Schott.—"Die Nauheimer Sprudel-und Sprudel-strombäder, Ebenda," 1884, No. 19.

Theodor Schott.—"Beitr. z. tonisirenden Wirkung Kohlensäurehaltiger Thermalsool-bäder auf's Herz," *Berl. klin. Wchnschr.*, 1883; "Die Behandlung der chronischen Herzkrankheiten," Berlin, 1887; "The Treatment of Chronic Diseases of the Heart by means of Baths and Exercises," *Lancet*, London, 1891, vol. i. p. 1143; "Ueber Herzneurosen," Eulenburg's *Real Encyc.*, 1892, Aufl. 2; "The Mineral Waters of Nauheim: Their Actions, Uses, and Effects," London, 1894; "Zur acuten Ueberanstrengung des Herzens und deren Behandlung," Wiesbaden, 1894; "Die Heilfactoren Bad Nauheims," Wiesbaden, 1900; "Der Neue kohlen säurereiche Nauheimer Thermalsoolsprudel Quelle," No. 14, Leipzig, 1900.

1. The operator stands in front of the patient, who extends his arms straight in front of him at the level of the shoulder—palm to palm. The operator places the palm of each of his hands on the back of each of the patient's hands, and then the patient slowly and steadily carries his arms outwards till they are in line with the shoulders, the operator resisting, but so gently and steadily that his resistance feels like the resistance of a buffer of air. When the movement is completed, the operator and patient are practically breast to breast, that is, the operator comes nearer to the patient as the movement progresses; and, that he may do this without jerk, he begins with his right foot well advanced, and gradually permits his left to swing up. When the arms of the patient have come to be in line with his shoulders, the operator slips his hands, palm uppermost, under the edge of the patient's, and so gently carries his hands down to the position of rest at his side. The patient then rests for a moment.

2. The operator stands at patient's side, and places the palm of his right hand on the patient's right wrist, the arm hanging straight down, palm to the front. The operator's left palm is placed across the patient's upper arm. The patient then slowly flexes the forearm on the upper arm against the operator's resistance. When it is fully flexed, the operator slips his right hand on to the back of the patient's, and then the patient extends the forearm against the operator's resistance. This is repeated on the other arm.

There are other movements of the arms—movements of flexion and extension of the thigh on the trunk, one leg at a time, and of the leg at the knee; movements of abduction and adduction of the leg; movements of flexion and extension of the trunk, and so on.

Now, the remarkable fact about such movements, when conducted as directed, is that they produce effects upon the vascular system akin in a very striking degree to those of the saline effervescing baths. Ludwig and his pupils[2] have shown how exercise causes dilatation of the muscular arterioles; and that whether this has any effect upon the blood pressure or not depends upon the degree and rate of exercise. Very gentle movements, with short pauses between, will produce muscular dilatation, quickened flow through the muscles, and a tendency to a fall of blood pressure. They have shown also that there is a reflex nervous effect from the exercised muscles on the heart, tending to quicken or slow its beat.

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[1] "The Schott Methods of the Treatment of Chronic Diseases of the Heart," London, 1896.

[2] Ludwig, *Arb. a. d. physiol. Anst. zu Leipzig*, 1869, 1870, 1876 (observations of Sadler, Lepine, and Gaskell).

George Oliver,[1] Edgecombe and Bain,[2] Lauder Brunton and Tunnicliffe,[3] using modern instruments of precision, all agree in showing that exercise has a twofold effect upon the vasomotor system—(1) the first being a dilatation of the muscular arterioles, (2) the second being a reflex effect upon the heart, the result upon pulse rate and blood pressure depending upon the degree of severity of the exercise, and the intervals between repeated acts. If the exercise be very gently and slowly repeated, there is a lowering of blood pressure and a slowing of the heart beat. In short, the *modus operandi* of these resisted movements is identical with what I have endeavoured to prove to be the *modus operandi* of the Nauheim baths. No vindication of the physiological soundness of the Schott-resisted movements could easily be more complete than that afforded of recent years by the employment of strictly scientific methods. "I must express my conviction," says Oliver,[4] "that this strictly physiological mode of developing and invigorating the walls of the heart, when applied with proper care and discrimination, is a therapeutic method of some value, and is a distinct addition to our resources for the treatment of failing compensation of the heart." Its results have been expressed with great lucidity by J. F. H. Broadbent.[5] "The slow movements of each limb, bringing into action different groups of muscles, in turn causes a flow to those muscles. The contraction of the muscles, being slow and gentle, does not rapidly force out the contained blood or compress the veins, so that, by the time each group of muscles has been brought into action, the vessels in them are dilated and full of blood. Hence a large amount of blood has been drawn into the muscular system; this gives relief to the heart, tending to empty the left ventricle, and enable it to contract down more completely on its contents. At the same time the peripheral resistance is lessened by the vascular dilatation, so that the left ventricle is better able to drive the blood through the system."

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[1] "Croonian Lecture," *Lancet*, London, 1896, vol. i. p. 1624; and "The Blood and Blood Pressure," London, 1901, p. 205.

[2] "The Effect of Baths, Massage, and Exercise on the Blood Pressure," *Lancet*, London, 1899, vol. i. p. 1552.

[3] "On the Effects of the Kneading of Muscles upon the Circulation, Local and General," *Journ. Physiol.*, Cambridge and London, vol. xvii. p. 364.

[4] *Lancet*, London, *loc. cit.*, p. 1626.

[5] "On Treatment of Chronic Heart Disease by the Methods of Dr. Schott, of Nauheim," *Practitioner*, London, 1895, vol. liv. p. 385.

The Schott methods, then, when fully employed, consist of a course of baths, aided and reinforced by a course of the resisted movements. But in the system the baths take first place, and many patients it may be deemed proper to treat by baths alone. Many cases are suited for the baths, for whom exercises would not be ordered. I am sure Dr. Schott would agree with that statement, and I am confident he would also agree that any opinion which holds the exercises to be superior to the baths, or to be capable of producing results the baths cannot do, is based on lack of experience of a proper employment of the baths.

I have already indicated that the bath course is begun with weak thermal baths, lasting for from six to eight minutes, at a temperature of from 93° to 95°, that, as a rule, a bath is given on two consecutive days, and then there is an interval of a day without a bath. After experience of the patient, the bath is gradually strengthened and lengthened, and its temperature lowered, till, after ten or fifteen thermal baths, the patient is prepared for the Sprudel. By this time probably he is getting a No. 7 thermal bath, with 3 or 4 litres of mutterlage, at a temperature of 89° or 90°, for fifteen or twenty minutes. He will then probably be transferred to a Spreudel No. 12 at the temperature of the spring, for ten minutes; and, after several of these, gradually lengthened to fifteen or twenty minutes, he will be transferred to Spreudel No. 7 for ten or twelve minutes, gradually increased to fifteen or twenty minutes or more. The Strom-bad thereafter is suitable for only a few cases. The characteristic effects of the waters are often not observed, or found to be very little, till the patient reaches the stronger baths, when they become obvious. Edgecombe and Bain have experimentally shown that the effects of the baths are cumulative.[1] When the bath course has advanced considerably, a course of movements may be begun, or this may not be taken till the termination of the bath course, or may not be taken at all. Each case must be judged by itself. Schott also sometimes goes on to a modified course of Oertel hill-climbing, and the paths in Nauheim are marked off in lengths and gradients for this purpose. At the conclusion of the treatment in Nauheim, the patient is sent to some resort in the Taunus, Black Forest, or Switzerland for two or three weeks of an after-cure. Patients are usually advised to return to Nauheim for a second season. Many return periodically. I have had no patient, able to afford it, who has not been most willing to do so, however reluctantly they may have gone for the first time.

VI. THE ARTIFICIAL BATHS.—It is to Dr. Schott's credit that he has consistently maintained that his methods may be practised away from Nauheim, with results similar in kind, if differing in quantity. I have not met any one, who has really studied the method in Nauheim, and has taken pains in the production of the artificial baths, who has not been willing to corroborate this statement. Something, of course, is due to the climate, the prolonged freedom from business, the natural waters, and so on. The course in Nauheim extends to twenty-five or thirty baths. I am accustomed at home to give from thirty-five to forty, in the hope of making up to some extent, by the increased number, for the lessened effect the artificial bath has in comparison with the natural.

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[1] *Loc. cit.*, p. 1554.

The chief ingredients of the Nauheim water are—common salt, 3 per cent.; chloride of calcium, 0·3 per cent.; and carbonic acid gas; and at first the artificial baths were prepared by the use of common salt and chloride of calcium, along with bicarbonate of soda and hydrochloric acid or Sandow's tablets to produce effervescence. Armstrong,[1] of Buxton, on this basis, devised a series of six baths as follows:—

	Common Salt.	Chloride of Calcium.	Soda.	Acid.
No. 1	4 lb.	6 oz.	...	...
,, 2	5 ,,	8 ,,	...	...
,, 3	6 ,,	10 ,,	6 oz.	7 oz.
,, 4	7 ,,	10 ,,	8 ,,	12 ,,
,, 5	9 ,,	11 ,,	1 lb.	1½ lb.
,, 6	11 ,,	12 ,,	1½ ,,	2½ ,,

It appeared to me, however, that since it was possible to obtain mother-lye, the concentrated liquor remaining after the removal of common salt, or its dry residue—the bath salt—a more exact imitation of Nauheim water might be produced by adding either of these to plain water in proper proportion, and restoring the common salt removed. The mother-lye and bath salt can both be imported to any amount from Frankfort-on-the-Main.[2]

I have therefore taken the official tables of composition of the bath waters, and have calculated out the quantity of common salt and chloride of calcium present in a bath of 50 gals. of No. 7 thermal sool-bath. I have next calculated how much Nauheim bath salt is required to yield the necessary amount of chloride of calcium, and, allowing for the amount of common salt it contains, how much common salt it is necessary to add. But it is to be noticed that the thermal sool-bath is not devoid of carbonic acid gas. On the contrary, it contains, according to the official analysis, 324 litres of such gas. Its brief sojourn in the tank has robbed it only of a proportion of its gas, so that it no longer visibly effervesces in the bath-tub. In imitating the water, this must be allowed for. I have therefore calculated how much soda and acid will yield what may be fairly held to equal the amount in the water as used at Nauheim. When the bath is ready, I add this quantity of these ingredients, stir them thoroughly, and thus the water becomes more or less impregnated with gas before the patient steps in. The same calculations are the basis of the Sprudel baths. In this case, I calculate the total quantity of acid and soda needed to yield the quantity of free gas officially said to be present in the water as it enters the bath-tub. All the acid and a proportion of the soda is added before the patient enters, and the remainder of the soda is sprinkled during the patient's immersion.

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[1] "The Nauheim Treatment of Chronic Cardiac and Allied Diseases," *Liverpool Med.-Chir. Journ.*, 1895, p. 491.

[2] The bath salt has been imported for me, since I began the use of it some five years ago, by Baird & Tatlock, London, Edinburgh, and Glasgow. A course of forty baths, made with the bath salts according to my directions, costs about £4.

In the following tables:—

No. 1 Thermal represents a No. 7 thermal sool-bath undiluted.
,, 2 ,, ,, ,, 7 ,, bath + 1 litre mother-lye.
,, 3 ,, ,, ,, 7 ,, ,, + 2 litres.
,, 4 ,, ,, ,, 7 ,, ,, + 3 ,,
,, 5 ,, ,, ,, 7 ,, ,, + 4 ,,
,, 1 Sprudel ,, a Sprudel No. 12.
,, 2 ,, ,, ,, ,, 7.
,, 3 ,, ,, ,, ,, 7 specially rich in gas.

The formulæ of the baths is printed at the head of a series of columns, on which can be entered the kind, temperature, and duration of the bath to be taken on specified dates, and the print which I give to my patients contains also a note of directions and cautions, which are reproduced here.

Artificial Nauheim Baths.

Quantities in each case for 50 gallons of water.

	THERMAL.					SPRUDEL.		
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 1.	No. 2.	No. 3.
Common salt	11 lb.	11 lb.	11 lb.	11 lb.	11 lb.	11 lb.	11 lb.	11 lb.
Bath salt[1] .	2¼ ,,	4 ,,	5½ ,,	7 ,,	9 ,,	5½ ,,	5½ ,,	5½ ,,
Acid[2]. . .	10 oz.	10 oz.	10 oz.	10 oz.	10 oz.	20 oz.	25 oz.	30 oz.
Soda[3]. . .	8 ,,	8 ,,	8 ,,	8 ,,	8 ,,	15 ,,	20 ,,	25 ,,

Note.—In the thermal baths all the ingredients are mixed before the patient steps in.
In the Sprudel baths three-fourths of the soda are retained to be sprinkled in by the attendant during the immersion of the patient.

[1] Nauheim bath salts. [2] Commercial hydrochloric acid. [3] Bicarbonate of soda.

No.	Date.	Kind.	Temperature.	Duration.	PULSE.		REMARKS.
					Before Bath.	After Bath.	
1							
2							
3							
4							
5							

INSTRUCTIONS.

1. The bath-tub should be enamelled or of wood.

2. Measure the capacity of the bath-tub, and place a mark at the level of 40, and another at the level of 50 gals.

3. *To make the Thermal baths—*

(*a*) Weigh out the salts, put them into the bath-tub, and run in water nearly up to the level of 40 gals., and within a degree or so of the ordered temperature, stirring till the salts are dissolved.

(*b*) Pour in all the acid, and mix; then run in sufficient water to fill up exactly to the mark of 50 gals., taking care at the same time that the temperature is brought exactly to the degree ordered.

(*c*) Finally, add all the soda and thoroughly stir, the patient standing by ready to step in.

The patient now steps in and lies down.

4. *To make the Sprudel baths—*

(*a*) Weigh out the salts, put into the bath-tub, and run in water, as above ordered, up to the mark 40 gals.

(*b*) Pour in all the acid, and mix; then bring up the level of water to the mark 50, making the temperature exact.

(*c*) Now, add *only about one-fourth* of the ordered soda, and mix.

The patient now steps in and lies down.

(*d*) The attendant now takes the remaining soda, and proceeds to sprinkle it all over the surface of the water, so regulating the amount sprinkled that all the remaining soda is not added till two minutes before it is time for the patient to step out, so that a continual effervescence is maintained during the immersion of the patient.

CAUTIONS.

1. In winter the bath-room must be heated to a temperature of 68° F.

2. The bath-room must be well ventilated, specially in the case of Sprudel baths.

3. The patient must be immersed over the shoulders, must lie perfectly still, and must not talk.

4. The patient *must be attended in the bath-room throughout the whole duration of the bath.*

5. When the patient steps out, he is invested at once in a hot bath-sheet by the attendant, who assists in drying. The patient then lies down in bed for *one hour*, at *absolute* rest.

6. During Sprudel baths the patient keeps the face turned upwards; and if the bath-room be small, or not easily ventilated without risk of draught, the attendant agitates the air by means of a fan in the neighbourhood of the patient's face, to prevent inhalation of carbonic acid gas.

The difference between these figures and those of Armstrong is very considerable, and I am not surprised if very little result is obtained by those who have limited the course to a few baths, made only of the first three or four of Armstrong's formulæ. At home I do not use the exercises. The experimental work to which I have referred proves how easy it is to overstep the limit of suitable resistance, and to raise, instead of lowering, the blood pressure, and increase, instead of lightening, the strain on the heart. It has always, therefore, seemed to me that the risk of the exercises is great, unless the operator has been very carefully trained, is regularly supervised, and has a great deal of practice. Such reliable operators are not numerous even in Nauheim, and are not easily got out of it. I have always relied, out of Nauheim, on the baths alone; and if proper cases are selected, one need not rely in vain.

A SCHEME FOR THE REORGANISATION OF THE MEDICAL CURRICULUM.

By Richard J. A. Berry, M.D., F.R.S.E., *Lecturer on Anatomy, School of Medicine, Edinburgh.*

The five years curriculum for the study of Medicine has now had a sufficiently long trial to justify its merits or demerits being weighed in the balance of a mature criticism. Introduced in order to better the study of disease clinically, it has lamentably failed in its object, and has merely resulted in an unwelcome increase of classes of all descriptions, many of them unnecessary, and almost all of them unscientifically arranged in their relationship to the other courses in the curriculum. It is no uncommon thing to find a student proceeding to the study of Clinical Surgery with absolutely no knowledge of Anatomy or Physiology, and, in many cases, whilst he is still struggling with the mysteries of Chemistry, or the beauties of Nature in the shape of Botany. Under such conditions, the student's knowledge of Clinical Surgery must at best be empirical and savour of quackery, whilst it is manifestly unfair to expect his teacher to build up within him a solid superstructure of Surgery on the shifting foundation of sand, to wit, Chemistry, Botany, and Physics, with which he has at present to deal. Even assuming a knowledge of Anatomy and Physiology, it is very much open to question if it is a scientific proceeding to inculcate the principles of Surgery into a man who knows no Pathology, who is, in fact, absolutely ignorant of the very meaning of the word. Nor is this the only defect of the present system. What can be more absurd than the present position of Materia Medica? Here a student is taught the preparations and doses of certain drugs, which he is told are infallible cures for certain diseases, the very names of which he has never heard before; and by the time he does come to understand the diseases some years afterwards, he has forgotten the drugs.

Again, why impart the legal side of infanticide to a man who has never attended even one case of normal labour, or why instruct in the filling up of an insanity certificate, a person who knows nothing of insanity? If this were done by a doctor to a layman, the former would probably be struck off the rolls for "infamous conduct," and yet it takes place daily in the medical curriculum.

Nor is this question of the arrangement of the various classes the only objection to the five years curriculum, as it is at present carried out. There are many other objections. In some medical schools there is over-much lecturing at all hours of the day, with the consequent result that the student is not taught to think for himself—he is reduced to a mere note-taking machine, and has no time for mental digestion. Further, his classes take up so much of his day, and are arranged at such inconvenient hours, that he has barely time to do any original reading, unless forsooth he injures his health by sitting up half the night or more in burning the midnight oil. Surely it ought to be the care of a wise and beneficent University to carry out the *mens sana in corpore sano* principle to the best of its abilities, unless indeed it be devoid of ability. The recent Commission, appointed in Edinburgh to investigate this very question of the class hours, revealed some striking defects in this respect. Amongst other things, it found that it was no uncommon thing for even a first year's student to attend classes from 9 A.M. to 3 P.M., without a moment's break for luncheon. Comment is superfluous. A navvy would knock such an employer down.

Again, the curriculum is so inconveniently arranged that it is positively detrimental to the teacher as well as to the student. He must either lecture, or play ducks and drakes with his consulting practice. If a scientist, he must either neglect the duties for which he is paid or run the risk of being dubbed a "crammer," who has no soul for science; and this being so, and examples could be multiplied, it is certain that the best work is not being obtained either from the teacher or the student.

Such are some of the more serious objections which ten years' experience has revealed in the present five years curriculum. Destructive criticism comes naturally to all men. Constructive criticism is a Herculean labour. Its difficulties ought not, however, to prove a deterrent, but rather an incentive, for the first School which manfully undertakes this task of reform will earn the gratitude of the medical profession as a whole, and will reap a rich financial reward for itself in the shape of an increasing undergraduate *clientèle;* that Edinburgh may prove to be this School must be the earnest wish of all.

In proposing a scheme for the reorganisation of the Medical Curriculum, and the abolition of its present many attendant evils, there are certain general principles which must be kept prominently in view.

First, Any reform, to be effective, must interfere as little as possible with the existing order of things—that is to say, there must be nothing in the nature of a great social upheaval, nothing which can be termed revolutionary. The history of all great movements amply proves the necessity for caution.

Secondly, The welfare of the student, and the fact that he is a human being with a limited capacity for work, must be borne in mind by any University which wishes to attract the half-matured youth within its portals. Nor must the necessities of the teacher be forgotten. The teacher also is human, a fact which he sometimes seems a little apt to forget.

Thirdly, There should be a scientific grouping and arrangement of the classes, so that each subject is naturally based upon the preceding one.

Fourthly, There should not be too many classes in any one day, nor should theoretical work crowd out practical instruction.

Lastly, The question of finance should form a powerful factor in any scheme for medical reform.

With these general remarks a scheme may now be propounded, whereby it is believed that all the objections to the existing system would be removed, and wherein the foregoing general principles are fully observed.

As the writer firmly believes that increased facilities should be given to students for entering a University, he would at the outset insist that the preliminary examination be held three times a year, and that entrance to a University be obtainable three times a year. This necessitates the division of the year into three terms instead of two, which is quite easily done by merely lengthening the Christmas recess to a month. The three terms would thus run somewhat as follows:—From the middle of January to the end of March; from the 1st May to the middle of July; and, lastly, from the 1st October to the middle of December. Roughly speaking, each term would average eleven weeks' duration. These terms might be known as the Spring, Summer, and Winter Sessions, the student to have the right of entering at the commencement of any one of these three sessions. Such a division of the year into three terms would have the further effect of abolishing the system of the one hundred lecture courses, which is such a peculiar feature of the Scottish schools, and which series of one hundred lectures is invariably either too much or too little. It is too much for Anatomy, Materia Medica, and Midwifery, and not nearly sufficient for Medicine and Surgery. The proposed system would substitute a series of fifty-lecture courses, given three times per annum. The precise working out of this subdivision will be shown presently.

The curriculum itself should also be subdivided into three parts, as is done in some of the English schools. These three parts, their subjects, and the relative amount of time devoted to each part, should be as follows:—

PART I.—*Preliminary Scientific* (three months).

SUBJECTS.—Chemistry, Physics, Biology, Practical Chemistry, and Practical Biology.

PART II.—*Fundamental Intermediate* (two years).

SUBJECTS.—*First Year.*—Anatomy and Physiology.
Second Year.—Anatomy, Physiology, Pathology.

PART III.—*Medical and Surgical* (two years and a half to three years, according to the proved abilities of the student).

SUBJECTS.—*Third Year.*—Surgery, Medicine, Materia Medica.
Fourth Year.—Medicine, Surgery, Midwifery, Medical Jurisprudence.
Fifth Year.—Specialties—Medicine, Surgery, and Dispensary Practice: the last as a fitting prelude to General Practice.

This curriculum is based on sound scientific principles. The student is first initiated in the elementary principles of Science, he then passes to the fundamental basis of all medical and surgical work, namely, Anatomy, Physiology, and Pathology. After a thorough grounding in these subjects, he proceeds to apply their principles clinically, and then, with a general knowledge of Medicine and Surgery, he proceeds to a study of their special branches, and concludes by applying all he has acquired in the treatment of disease to Dispensary Practice as a most fitting prelude to his life's work—General Practice.

As regards the general question of Professional Examinations, there should be at least three, and possibly four. The writer inclines to four, but these details are subject to adjustment as experience might dictate. Regarding the first two examinations there is no doubt; the preliminary scientific work forms the subject for the first examination. Anatomy, Physiology, and Pathology together quite naturally form the second group. Of the wisdom of grouping these three subjects together there can be no question. The student is then studying normal anatomy, minute anatomy, morbid anatomy, and every one who has studied these three subjects must realise how remarkably well they harmonise together. Of the usefulness of a knowledge of Histology, when engaged in the study of Microscopical Pathology, every teacher is surely convinced. The remaining subjects in the curriculum may either be grouped together to form the Final Examination, or may be divided into two. The writer himself is of opinion that the subjects are too extensive to form one examination, and he therefore inclines to their subdivision. On this assumption there would be four examinations; their subjects and the periods at which they should be passed would therefore be as follows:—

First Professional Examination.—To be passed at the end of the first three months of study.

Subjects.—Chemistry, Physics, Biology, and Practical work.

Second Examination.—To be passed two years after having passed the First Professional.

Subjects.—Anatomy, Physiology, and Pathology.

Third Examination.—To be passed two years after having passed the Second Examination.

Subjects.—Materia Medica, Midwifery, and Medical Jurisprudence.

Final Examination.—To be passed three, six, or nine months after having passed the Third Examination.

Subjects.—Medicine and Surgery.

All the examinations are to be held three times a year. In the event of failure in any one examination, the student is to be referred back again to his professional studies, and is not, under any circumstances, to be allowed to proceed with any other studies in the curriculum until he has passed in the subjects in which he has failed. Three successive failures in the First Professional Examination are to be followed by the student's withdrawal from the study of Medicine, as being mentally unfit. This system has the obvious advantages of encouraging capable men to work, of weeding out the incapable ones, of giving the hard-working man that start over his indolent brother to which his industry has entitled him, and, lastly, of speedily convincing those men who are manifestly unfitted for the pursuit of Medicine, that they are wasting their time and money in a pursuit for which they have neither the inclination nor the brains. It would further put a stop to that iniquitous system whereby a student goes on attending successive classes without ever proceeding to his professional examinations at all, for he would speedily become tired of attending eternal lectures on Chemistry and other sleep-inducing subjects, and would the sooner betake himself to other fields more suited to his defective mental capacities.

As regards the last examination—whether the candidate be permitted to appear in Medicine and Surgery, three, six, or nine months after having passed his Third, should depend on his class results in those subjects. If a man can produce satisfactory evidence from his teachers that he has diligently performed the work expected of him, he should be allowed to shorten his course accordingly, as a reward for his industry. Such a procedure is further safeguarded by the fact that it does not necessarily follow that he would shorten his course, as he would yet have to pass the ordeal of examination. The actual duration of the course would thus vary from four years and six months to a lifetime, according to the mental capacities of the student, and the depth of his parent's pocket.

Respecting the actual working out of such a curriculum, the details will be seen from a study of the appended table. In the compilation of this table, the most careful attention has been devoted to the requirements of the student and of the teacher. The former is not to be overworked, the latter is to have time for other pursuits, without neglecting the duties for which he is paid. An attempt has also been made therein to avoid early classes and afternoon classes, or, at all events, to insure all theoretical classes being held in the morning, and practical work in the afternoon. In the third year there are no afternoon classes of any description, and in the fourth and fifth years but few. In the first two years the urgent necessities of Practical Anatomy and Practical Physiology demand some afternoon work. The description of the table of classes may perhaps best be done by taking each year seriatim.

First Three Months — Preliminary Scientific Work. — The enormous advances made within recent years in Medicine, Surgery, Physiology, and Pathology, absolutely demand more time being devoted to their study. This can only be attained either by lengthening an already sufficiently long course, or by cutting down some of the more unnecessary parts of the course. It seems decidedly advantageous to adopt the latter method, which has accordingly been done. Consequently, three months only has been allotted to the preliminary scientific work. At the same time, if the authorities deemed this time too brief, it might possibly be extended to six months, but not more. Further, the examination in these subjects should not be too searching, for, after all, their object is only to inculcate scientific principles into the would-be general practitioner. Assuming the three months course, the student attends fifty lectures on Chemistry at 10 A.M., and fifty hours of Practical Chemistry at 2 P.M. Physics seem to follow quite naturally, and is therefore scheduled to follow the Chemistry lectures at 11 A.M., and is followed in its turn by a course of fifty lectures on Biology at noon. A six weeks afternoon class is to be devoted to Practical Biology. This, perhaps, is the only instance in the proposed curriculum where a radical alteration can be said to have been made, namely, the substitution of Biology for Botany and Zoology. Nor can this be justly termed too revolutionary, for it is already in existence in the Scottish Conjoint Board, and in many of the English Schools. The student cannot be said to be overworked, nor has the teacher in any one of these three subjects too much to do.

First Year—Fundamental Intermediate.—This year is to be devoted entirely to Physiology and Anatomy, in this way:—At 10 A.M. the student is to attend a course of Theoretical Anatomy for three sessions, making in all a series of 150 junior demonstrations in the subject. The precise adjustment of these details should be left to the teacher. Those who believe in lectures would doubtless adhere to that mode of teaching an essentially practical study like Anatomy. The absolute requirement is, that each course of fifty hours must be complete in itself, as students would be joining the class at each one of the three periods into which the year is divided. A preferable system to a course of 150 formal lectures would be the division of the series into three distinct parts—a series of demonstrations on Osteology, a second series of demonstrations on the Heart, Lungs, and other viscera, and a third series of junior demonstrations on the Brain and Nervous System, preparing the student at once for both his Anatomical and Physiological studies; and, further, giving a student, no matter at what period he joined the class, a complete course in itself, and one whereby every member of the class would in turn complete the necessary cycle of the 150 demonstrations.

At 11 A.M. the student passes into the hands of the physiologist for two hours, that is, for a course of fifty hours' practical work; and a second period of fifty hours, the details of which should be left to the physiologist himself, the only absolute essential being that every period of fifty hours must form in itself a short but complete course.

At 1 P.M. the student has finished with all theoretical work and all Practical Physiology. He has now the entire afternoon to devote to his Practical Anatomy, attendance at which should be made compulsory for at least one hour and a half per diem.

Thus the first year passes, with the net result that the junior student has put in 150 hours at Anatomical Demonstrations, 300 hours at Physiology, and nine months' Practical Anatomy. He should now be prepared to pass to the study of Pathology in his second year, whilst still further adding to his efficiency in Anatomy and Physiology.

Second Year.—Fundamental Intermediate.—As there is now an additional subject to be studied, the student must be prepared to commence work at 9 A.M. with Senior Anatomical Demonstrations. He again attends three courses of fifty lectures each, and again each course must be complete in itself. This is quite easily accomplished in Anatomy by giving one course on the two limbs, a second course on the abdomen and thorax, and a third course on the head and neck, so that, no matter at what period a student joins the class, he receives his cycle of three complete courses.

At 10 A.M. he passes again to the physiologist, who devotes a second cycle of three courses of fifty hours each, in the manner which he thinks most satisfactory.

At 11 A.M. the student proceeds to the pathologist, in whose hands he remains for the next two hours; say, one course of fifty lectures on Theoretical Pathology, and a second of fifty hours' practical instruction, combined with post-mortem work. The student here also is to complete a cycle of three courses throughout the year, making in all 300 hours devoted to the study of Pathology, in whatever way the teacher thinks most conducive to the advancement of his subject in his students' minds. The absolutely thorough and efficient training which a man would thus gain in these three important and fundamental subjects will be obvious from a comparison of the relative number of hours devoted to each subject under the existing regulations and those now proposed.

Present.	*Proposed.*
ANATOMY.	
Lectures, 100 hours.	Junior Demonstrations, 150 hours.
Senior Demonstrations, 100 hours.	Senior Demonstrations, 150 „
Practical Anatomy, 12 months.	Practical Anatomy, 18 months.
PHYSIOLOGY.	
Lectures, Junior, 100 hours.	Junior, 150 hours.
Lectures, Senior, 100 „	Senior, 150 „
Practical, about 120 „	Practical, 150 „
PATHOLOGY.	
Lectures, 100 hours.	Lectures, 150 hours.
Practical, 50 „	Practical, 150 „
Post-mortems, occasionally.	Post-mortems, 12 months.

From this table it is obvious that any teacher who cannot teach his subject under the proposed system, with a reasonable guarantee of insuring a capable student passing a creditable examination, must be deemed incompetent.

Analysing this scheme from the teacher's standpoint, it is evident that the anatomist will be engaged in teaching from 9 A.M. to 10 A.M., that he may continue teaching from 10 A.M. until 11 A.M. if he wishes, or he may hand over this hour's teaching of junior students to an assistant, in which case he will be free from 10 A.M. until 2 P.M. or thereabouts for the pursuit of original investigation, returning at that hour to supervise the dissections in the rooms. Even though he did both hours' teaching in the morning, he would still have three hours off, in which to recuperate after his exhausting morning's labour of two hours' consecutive teaching.

The physiologist is engaged in teaching from 10 A.M. until 1 P.M., but he would presumably hand over at least one of these three hours to an assistant, in which case he is only required to do two hours' teaching; and he still has this great advantage over the anatomist, that his entire afternoon is quite free for any other pursuit, be it work or recreation.

So with the pathologist: he does two to three hours' teaching a day, and has the rest of the day to himself.

Third and Fourth Years.—Medical and Surgical Work.—It will be unnecessary to pursue the topic of reform in the same detailed way in which it has been dealt with in the two preceding years. Suffice it to point out some of the more important alterations. The principle underlying these alterations is, that the student is to gain a thorough training in General Medicine and Surgery before passing on to their special branches; further, that he is to attend Medicine and Surgery, whether clinical or theoretical, alternately. The enormous advantages of this procedure are very obvious. Having passed in Anatomy, Physiology, and Pathology, the soil is now ripe for the sowing of the surgical seed, with some reasonable hope that it will not fall among tares and be swallowed up in the weedy growths of Chemistry and Physics. Concurrently with this, he attends a course of Materia Medica, followed by a course of Practical Materia Medica. After six months tuition in Surgery and Materia Medica, follows a six months course of Medicine and Clinical Medicine, and quite naturally a course of fifty lectures on Therapeutics. This last completed, he commences his study of Midwifery, and then returns to his surgical studies, still more able to appreciate the rationale of sounding a patient's heart before the administration of an anæsthetic, and the why and wherefore of the exhibition of certain drugs in some surgical cases. During this three months he adds on to his curriculum the study of Gynæcology, with its minor operations, and is now ready to attend Practical Midwifery. Then, returning once more to the medical side, the student can now differentiate as to when to administer drugs and when to operate, as for example in appendicitis; and he is now in a thoroughly sound position to appreciate the relationship of the Law, as expounded in Medical Jurisprudence, to Medicine, Surgery, and Midwifery. Here it may casually be remarked that the very time when it is practically impossible for any medical man to obtain a Public Health appointment, without a special diploma in that subject, is not the best advised period wherein to tack on a special course of Public Health, with a special fee. The old régime should be reverted to, whereby the medical jurist taught the general principles of Public Health, and did it well. Therefore, in this scheme, Medical Jurisprudence covers Public Health. Next comes the Third Examination, and lastly the special courses in Ophthalmology, Insanity, Fevers, Ear and Throat, and the Diseases of Children. In this period there might well be some form of apprenticeship resorted to, either to a public dispensary or to a general practitioner in the University town wherein the student was matriculated. The period of the qualifying examination has been referred to already. If the student be not permitted to appear for the last examination before the expiration of twelve months after passing his Third, he has ample opportunity for augmenting his studies in Medicine and Surgery, if he so desires, as is obvious from the table.

Regarding the work devolving on the various teachers in the last three years, it is self-evident that greater opportunities are presented to the teacher in every subject, with perhaps the exceptions of Materia Medica and Medical Jurisprudence, both of which, as regards actual totality of lectures, remain as they are at present; but even here it must be remembered that the two subjects are placed in the proposed scheme in such a position that the student can understand what is being said to him, which he cannot do at present.

In Medicine the facilities for teaching are increased, as they are in Surgery. The actual hours of the classes stand either as at present, or are improved, and the consulting hour is not consequently affected, as it is now, to the detriment of both patient and physician. Operative Surgery constitutes a difficulty. It should be held at 10 A.M., but this would involve a distinct hardship on the teacher, unless indeed a special teacher were appointed. If not, it means that the surgeon would be asked to teach for one period of three months from 9 A.M. until 11 A.M., and then to commence his hospital work, which seems rather too much. Perhaps the surgeons could best settle this point.

In Midwifery, the teacher is left with a hundred lectures, a three months course at the Maternity Hospital, and a three months course of Practical Midwifery, wherewith to inspire his pupil with the fact that his subject is the most important in the curriculum! Surely even the most enthusiastic obstetrician cannot complain that his subject has been neglected in this new scheme.

Before finally leaving this part of the proposed scheme, it must be again emphasised that each course of fifty lectures, or fifty hours practical work, must be complete in itself, as students would probably be joining the course at any one of the three periods. In the majority of cases this would work out quite satisfactorily, but it might occasionally happen that a student would, let it be supposed, be attending a course of Therapeutics before he had attended a course of Materia Medica; but even then he would not be so badly off as he is at present.

Lastly come the questions of finance. Within recent years it has been the tendency to add to rather than to diminish the student's financial burden, a regrettable and unwise policy. The fate of the foolish fellow who killed the goose that laid the golden eggs should be borne in mind. At the present moment a student pays for his first professional education something like twenty-two guineas, made up as follows:—

Chemistry Lectures	£4	4	0
Practical Chemistry	3	3	0
Physics	3	3	0
Botany Lectures	4	4	0
Practical Botany	2	2	0
Zoology Lectures	4	4	0
Practical Zoology	2	2	0
Total	£23	2	0

Considering all the practical utility these subjects are to a student, this sum is surely excessive. Under the new scheme the fees should be three guineas each for the three classes, and two guineas each for the two practical classes, making a total of eleven guineas.

In Anatomy and Physiology, a student's minimum expenses are about thirteen guineas in the former, and twelve in the latter. Often very much more is expended, especially in Anatomy. Under the new régime, the cycle of junior lectures should all be taken out with one teacher, for a fee of four guineas, the same fee to be paid for Practical Anatomy, unless indeed both subjects were taken out with one teacher, when a composite fee of seven guineas might be adopted, as is now done with the senior demonstrations. Similarly with Senior Anatomy, the cycle of senior demonstrations might be given for three guineas, and Practical Anatomy for four guineas, with a composite fee of six. If the student exercised his choice of teachers he would pay accordingly, whilst if he took out any two portions with the same teacher he would benefit under the composition fee as he does now. In both cases, the total cost of his anatomical education would remain the same, namely, thirteen guineas; the only difference being that, under the proposed régime, he would get value for his money, which at present he does not. So with Physiology, a four-guinea fee for each of the three cycles would bring the cost to very much what it is at present, twelve guineas. The same system might quite easily be worked out for all the other classes; the great point being that the total cost of fees would not be greater than at present, but would probably be rather less.

It must thus be evident that the medical curriculum is capable of a very distinct improvement without any great revolution occurring, either in the matter of any one's personal convenience or pocket. This being so, its present fatuous arrangement is incomprehensible. That the Scottish Universities Commission barred the road to progress, and put back reform for another half century, is now sufficiently clear to all but the most bigoted educational patriarchs. It behoves the younger generation to rise up and to put the science of Medical Education on its proper footing—common sense.

Scheme for the Reorganisation of the Medical Curriculum.

PERIOD OF STUDY.	YEAR.	SESSION.	9 A.M.	10 A.M.	11 A.M.	12 Noon.	2 P.M.	3 P.M.	4 P.M.	
PRELIMINARY SCIENTIFIC.	..	Winter.	..	Chemistry.	Physics.	Biology.	Practical Chemistry, 3 Months.	Practical Biology, 6 Weeks.	..	
INTER-MEDIATE.	*FIRST.*	(a) *Spring.*	..	*Osteology.*	*Chem. Phys.*	*Junior Phys.*	*Junior Practical Anatomy.*			FIRST PROFESSIONAL EXAMINATION. 1. Chemistry. 2. Physics. 3. Biology.
		(b) *Summer.*	..	*Junior Anat.*	*Histology.*	,, ,,	,,	,,	,,	
		(c) *Winter.*	..	,, ,,	*Exper. Phys.*	,, ,,	,,	,,	,,	
	SECOND.	(a) *Spring.*	*Senior Anatomy.*	*Senior Phys.*	*Pathology.*	*Pract. Path. Post-mortems.*	*Senior Practical Anatomy.*			*SECOND PROFESSIONAL EXAMINATION.* 1. *Anatomy.* 2. *Physiology.* 3. *Pathology.*
		(b) *Summer.*	,, ,,	,, ,,	,,	,,	,,	,,	,,	
		(c) *Winter.*	,, ,,	,, ,,	,,	*Bacteriology. Post-mortems.*	,,	,,	,,	
MEDICAL AND SURGICAL.	THIRD.	(*a*) Spring.	Surgery.	Materia Medica.	Clinical Surgery.		..	..	..	
		(*b*) Summer.	,,	Pract. Mat. Med.	,,	,,	..	..	..	
		(*c*) Winter.	Medicine.	Therapeutics.	,,	Medicine.	..	..	..	
	FOURTH.	(*a*) Spring.	Medicine.	Midwifery.	Clinical Medicine.		Maternity.	..	..	THIRD PROFESSIONAL EXAMINATION. 1. Materia Medica. 2. Medical Jurisprudence. 3. Midwifery.
		(*b*) Summer.	Surgery.	Gynæcology.	,,	Surgery.	Practical Midwifery.		..	
		(*c*) Winter.	Medicine.	Medical Juris.	,,	Medicine.	..	..	..	
SPECIAL.	*FIFTH.*	(a) *Spring.*	*Diseases of the Eye.*	*Insanity and Fevers.*	*Sick Children.*	*Eye, Ear, Skin.*	*Dispensary Practice.*		..	*FINAL EXAMINATION.* 1. *Medicine.* 2. *Surgery.*
		(b) *Summer.*	*Surgery—Optional.*	..	*Clinical Surgery.*		,,	,,	..	
		(c) *Winter.*	*Medicine—Optional.*	..	,,	*Medicine.*	,,	,,	..	

THE MODERN TREATMENT OF GONORRHŒA.

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The treatment of gonorrhœa, both acute and chronic, almost always presents many difficulties; the nature of the disease itself engenders in patients the desire for secrecy, and often the treatment is greatly hampered by the inability of the sufferer to use the required medicaments, namely, injections, aromatic oils, etc., for fear of discovery. The irrigation treatment of gonorrhœa, to a certain extent, does away with these objections, as this treatment is carried out in the medical man's consulting-rooms.

Apart from the social advantages, the thoroughness with which the diseased areas are treated by the practitioner himself, instead of the usually very slipshod way with self-treatment, must present itself to all.

It is probably a drawback to some—the necessary daily attendance at the medical man's house. It is generally accepted that in any gonorrhœa lasting a considerable period, say over six weeks, the posterior or membrane-prostatic urethra becomes invaded, and this fact is the one which renders the treatment of gonorrhœa of, as we may say, a subacute type, so difficult by the older methods, for however skilful a patient has become in the use of his syringe, and some undoubtedly, after a time, do thoroughly distend and flush out their anterior urethras with injections, it is almost impossible for them to reach the posterior portion.

A few, a very few, may use an instillator of Guyon, or other pattern, to inject into the posterior urethra, but even if a patient is found skilful enough and with sufficient courage to use this instrument, it is doubtful if it is altogether safe to instruct him or allow him to so use it.

The following description of the technique of urethral irrigation is based on those described—first by Janet, and later by Valentine, to whom all who use and find the usefulness of this method of treatment owe much in the elaboration and designing of apparatus and instrument for the more perfect carrying out of these methods.

Acute anterior gonorrhœa.—During the acute stages of gonorrhœa there are several methods of treatment. The so-called abortive treatments certainly have something to recommend them, and have very distinct drawbacks. When, on the first or second day, a patient complains of a tickling or burning sensation, with a mucoid secretion showing only epithelial cells and gonococci, but no pus cells, it is permissible to make an effort to abort the disease, and there is reasonable hope of success, though undoubtedly it is a surgeon's duty to make it clear to the patient that the treatment may be very painful, and that it may fail.

The first method to be described is as follows:—

The patient urinates and remains standing; the urethra is flushed out by means of a soft catheter, No. 6 English, being passed 4 in. into the urethra, attached to a large syringe, holding 2 oz. of a warm saturated solution of boracic acid; then a urethroscopic tube is introduced 4 in., the obturator withdrawn, and an applicator, provided at the end with a cotton-wool swab, large enough to well separate the urethral walls, and soaked in a solution of protargol, 50 grs. to 1 oz.—this is made to protrude beyond the urethra tube, and the tube and applicator gradually withdrawn, the surgeon slowly rotating it from side to side. The tube used should be the largest size that will comfortably pass the meatus. After this operation the patient should keep at rest in the recumbent position; lint, wrung out in hot water, applied to the penis; the bowels should be well opened, and the diet low.

The reaction may be somewhat severe, with a purulent discharge in a few hours. In successful cases the suppuration gradually subsides, the discharge becomes thin and watery, and disappears in four or five days. An astringent injection is usually necessary for a few days, to entirely dry the mucous membrane. In failures, the acute stage develops with, possibly, great severity. By this procedure a substitutive inflammation is set up, and the gonococci are destroyed; the epithelial layer in which they are situated is necrosed by the caustic, and thrown off. It is gradually, in a few days, replaced, the œdema of the tissues subsides, and a healthy mucous membrane left. No doubt the most difficult part of the treatment is the getting of the patient to submit to it, for until the disease is fully developed with profuse discharge, painful urination, etc., they fondly hope that they have not a real gonorrhœa, but have only "strained" themselves. And, generally, it is useless to try and convince them, by assuring them that gonococci are in numbers in the mucoid discharge, and that this is only the early stage of a disease which they themselves know of as consisting of great pain, and of purulent discharge.

In the more ordinary treatment to be adopted in acute gonorrhœa, rest certainly is the most important measure, preferably in the recumbent position; this, unfortunately, is usually difficult for private patients to carry out, but in all cases where it can be, the importance should be clearly explained. As rest cannot be taken by many, our next duty is to instruct our patient as to the worst forms of exercise. He should be told never to walk if he can ride, to sit rather than stand, and to absolutely avoid horseback riding, cycling, dancing, and rowing. Support of the testicles is important, with a neatly fitting suspensory bandage. Diet is of the utmost importance, plain nourishing food being required. It is a good plan, if possible, to give patients a written list of articles to be avoided in both eating and drinking. All highly-seasoned dishes, and meats, fish, etc., re-cooked; curries, salads, soups, asparagus, tomatoes, pastry, sauces, pickles, mustard, and pepper; alcoholic liquors, ginger-beer or ale, home-made lemonade—should all be prohibited. With regard to aerated waters, patients are usually recommended to partake of them freely. It is certainly doubtful if this should be permitted, as all carbonated drinks are genito-urinary irritants; in moderation they probably do little harm, but in the large quantities they are frequently drunk, they must, to a considerable extent, irritate the urethra. The dressing of the penis should be inquired into, rubber bags entirely condemned, and any arrangement that presses on the penis, or allows that organ to be in constant contact with the pus oozing from the meatus, should not be allowed.

Soaking the penis in hot boracic baths is useful and comforting to the patient. The bowels must be kept freely open, a cathartic pill every third day during the acute stage is advisable. Saline cathartics and the natural waters are to be avoided, as the magnesia sulph. they contain irritates the urethra as it passes off in the urine.

The urine should be kept alkaline and bland, by potass., bicarb. and acet., combined with tinct. hyoscy. For the relief of chordee, etc., the hard bed and towel with a knot are familiar to all. The following injection will be found very useful also:—

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Liq. morph. hydrochlor. . .	15 minims.
Cocaine hydrochlor. . .	½ gr.
Aq. ad	2 drms.

M.

Inject into the urethra and hold five minutes, just before retiring.

Suppositories, bromides, and chloral, with phenacetin and antipyrin, may be used.

Local treatment.—This has always been a much debated point, many authors advocating waiting for the acute stage to pass off before any local treatment. This waiting certainly allows the gonococci to increase and to invade the tissues more deeply, and since irrigation has become an actual treatment it seems more rational to endeavour to arrest the morbid process as soon as possible. There are many and various opinions as to how irrigation arrests the progress of the disease, but the theory that the volume of hot water employed induces a sort of artificial œdema of the urethra, making it unfavourable culture medium for the gonococci, seems very feasible.

Irrigation having been decided upon, the earlier it is begun the better. Patients who are seen very early in this disease will pass through it without practically any pain, and those who are further advanced, and in the stage of profuse discharge, ardor urinæ, etc., will quickly be reduced to a comfortable state. It is not at all unusual to have cases such as these completely well in three weeks.

For the purpose of irrigation, the apparatus described by Dr.

F. C. Valentine is certainly by far the most convenient and cleanly. It consists of a receiver of varying capacity, one holding a litre being the usual size; rubber tubing with metal shield and glass nozzle completes the apparatus; the receiver travels up and down a slide which is fixed against the wall, the upper end being nine feet from the floor; this gives greater convenience in filling than having a stationary fixed receiver, necessitating climbing up to fill each time.

The technique of the operation is as follows:—The patient should be reclining on a couch, with the shoulders raised. This is not necessary—indeed, some surgeons prefer the sitting position; but personally I think the recumbent position has its advantages. The parts being fully exposed, and the clothes protected by towels, the receiver is filled with the chosen solution, made hot, and run up to the top of the slide.

A basin, or receiver, is placed between the thighs, well up beneath the testicles; a suitable nozzle having been selected, according to the size of the meatus, it is fixed to the rubber tubing; the stop-cock is then released, and the glans and prepuce are washed with the solution; the penis being held by the left hand, the thumb and forefinger on the glans, the other three fingers being pressed on the under surface of the penis, against the urethra. The nozzle is then introduced loosely into the meatus; the stop-cock not being fully turned on, does not allow the full force; therefore the anterior urethra only is flushed. When the receiver is two-thirds empty the nozzle is firmly pressed into the meatus, and the stop-cock fully turned on. The patient is then directed to take a deep breath, and make an effort to pass water, when the solution will pass through the compressor muscle into the posterior urethra and bladder. The bladder should have been emptied some half hour before the operation is commenced, in which case he will be able to hold all the solution (one-third of the receiver) until the completion of the irrigation. In cases where this is found to be not possible, the stop-cock is closed, the nozzle withdrawn, and the patient is directed to empty his bladder into a urinal, after which the nozzle is again firmly introduced, and the posterior urethra and bladder flushed with the remainder of the solution, which in turn is expelled.

With regard to the draining of the solution during an anterior irrigation, I find it is very convenient to have an earthenware dish resting between the thighs, and beneath the penis, which, with a little practice, will be found to catch all solution as it spurts from the meatus against the metal shield. Some prefer to have a rubber sheet underneath the patient, with a tube leading down to a basin on the floor, but this is simply a matter of personal convenience. During posterior irrigation no solution at all should pass out of the meatus, it being entirely occluded by the nozzle.

As in acute gonorrhœa, the anterior urethra is practically always the primary seat of infection, and the bulb becomes a suppurating pouch. If the irrigation treatment is commenced early, it is necessary to give this part of the canal the most thorough flushing with the greatest proportion of the solution, the remaining small part being passed through the posterior urethra as a safeguard. But as in a large percentage of cases the posterior urethra becomes invaded, after the end of the first week, in neglected cases, or ones that are not seen until after this period, it is advisable to give both the anterior and posterior urethra equal amounts.

It is of course advisable, and recommended by both the great authorities on irrigation—Janet and Valentine—that these irrigations should be performed twice daily, morning and evening; but in ordinary private practice this is almost impossible, as patients will not be bound down to these frequent attendances, so that daily irrigations are the most we can hope for.

If this treatment be continued for a fortnight, in cases seen early the patient will escape with very little pain or discharge, and at the end of that period there will probably be left only a few clear or milky drops. Irrigation seems to have exhausted its utility at this point, and we now instruct the patient to use himself an astringent injection, three or four times daily. Such an one should be retained in the urethra from one to four minutes. This, continued for a week, will probably complete the cure.

Irrigation does not claim to be an abortive treatment, or to work miracles in a few days, but it is certainly a great advantage to be able to promise a cure in three and weeks, when, with the ordinary treatment of balsams, injections an indefinite period of five to eight weeks is the most that can be hoped for. A mixture of large doses of potash, bicarbonate and acetate, with salol and hyoscyamine, frequently aids local treatment, and sandal-oil and catechu may also be exhibited internally.

Chronic gonorrhœa or gleet.—In the more chronic forms of gonorrhœa it is always distinctly advisable to make a thorough examination with the urethroscope; there are many patterns of the instrument, but Schall's, *with an inflating apparatus,* I think meets all requirements. If the urethra is previously injected with 20 mm. of a 5 per cent. cocaine solution, this procedure is quite painless. It is advisable only to examine the anterior urethra, as, except in skilled hands, examination of the posterior urethra may be attended with unpleasant consequences. The areas infected are generally the deeper portions of the urethra—the bulbo-membranous and prostatic—quite the commonest probably being a membrano-prostatic catarrh. It is self-evident that in this condition hand injections are futile, for the compressor-urethræ muscle effectually prevents their ever reaching the diseased areas, and these are more readily treated by posterior irrigation than by any other method.

The technique of the operation in these cases is exactly the same as that described for acute, with the exception that only a small quantity (one-fifth) of the solution is allowed to run in and out of the anterior urethra. The nozzle is then pressed firmly down, stop-cock fully opened, and the posterior urethra flushed until the patient's bladder is distended, when he is allowed to void the contents, after which more solution is allowed to run in. This is repeated until the receiver is empty. Daily irrigations are very much the most successful. In the event of these being impossible, alternate days must be insisted upon. A cure may be hoped for from two to four weeks. The other methods of treating chronic urethritis are: *By direct application of strong solutions* to the diseased areas, through the cannula of the urethroscope. This method is particularly applicable to those cases where the disease is located—as in granular patches, and the like.

By instillation.—This method is second only to irrigation, and may be employed in membrano-prostatic catarrh, preferably in conjunction with a preliminary irrigation, or alone. The Guyon cathetic syringe is usually advocated for instillations, but personally I prefer a small silver tube with a short terminal curve, screwed on to a hypodermic syringe, because, with practice, it is as easy, if not easier, and quite as painless to pass, with the advantage of knowing exactly when the point is through the compressor muscle, and in the posterior urethra, which is not always easy to determine with a soft flexible tube. The instillations may be performed every second, third, or fourth day, according to the strength of the solution used, immediately after an irrigation.

Cold sound.—The passage of medium-sized metal sounds is a useful adjunct to other treatment, and the psychrophor is still more useful, in that the surface can be kept cold by the water running through it for a longer time.

Neither of these methods will probably effect a cure alone. *Antrophores* are particularly useful in the treatment of those patients who are unable to attend regularly for the purpose of irrigation or instillation, as they may be used by the patients themselves, and do not necessitate the aid of the surgeon. They consist of small coiled springs, coated with an insoluble substance, outside which is a soluble mass, with which the various drugs are incorporated. They are made in two forms—urethral and prostatic. The former are about 6 in. long, the latter about 9, and the selection depends on the site of the disease. They are introduced into the urethra, preferably on going to bed, and are left in fifteen minutes. The stem is then withdrawn, most of the drug mass remaining in the passage all night.

The introduction of *flexible bougies,* coated with ointment, is sometimes useful, and can be used by the patients themselves. No. 10 English is a useful size, and should be left in fifteen minutes, on going to bed, as with antrophores.

Drugs.—The drugs in use for the treatment of gonorrhœa, both acute and chronic, are many and various, but in practice it will usually be found far better to limit one's self to the use of a few, and become perfectly familiar with the action of these.

Since the introduction of the irrigation treatment, permanganate of potash has been principally advocated. Personally, after extensive trials, I have become convinced protargol is by far the most useful drug we have at our command. In the acute stages, irrigation with protargol has given much better results in my hands than either permanganate of potash or boracic acid. It should be commenced with the strength of 1 to 400; if irrigations are daily, by the fifth day 1 to 200 will be reached. This strength will usually be found sufficient, although sometimes it is advisable to increase to 1 in 100. These irrigations, as far as the drug is concerned, are painless, and this fact, combined with the penetrating power and bactericidal properties of protargol, are greatly in its favour, and give it an immense advantage over the painful nitrate of silver.

As the disease subsides, weaker solutions are gradually substituted, and I frequently finish up with a few irrigations of ichthyol, 2 per cent. This drug seems to have a certain sedative and tonic effect on the urethra. If the irrigations do not effect a complete cure, hand injections, with the ordinary urethral syringe, of protargol, 1 to 4 per cent., may be used three to four times daily, and retained in the urethra three to ten minutes, or hollow cacoa butter bougies, 3 in. long, with ½-gr. doses of protargol in each, may be used every night. Occasionally, astringent injections are required in the finishing process when there is a thin glycerin-like discharge, a useful one being

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Zn. sulph.	½ gr. to 3.
Pb. subacet.	"
Tr. catechu.	10 to 30 minims.
Glycerin	½ drm. to 1 drm.
Aq. ad	1 oz.

M., Ft. inject.

Of course, both these injections and bougies are of use only in cases where the disease is limited to the anterior urethra; where the posterior urethra is also invaded, continued posterior irrigation is necessary, or antrophores may be used.

In chronic cases it is as well to begin, for the first week, with protargol irrigations, 1 in 200 to 1 in 100, then to change to a more astringent injection, an exceptionally useful one being—

℞

Zn. sulph.	30 grs.
Pulv. alum.	30 "
Aq. ad	1 oz.

M.

This being added to the receiver, full of hot water, the posterior urethra is then irrigated, as before described.

In instillation.—Protargol again may be said to head the list; 5 to 20 minims of a 5 to 20 per cent. solution is instilled into the prostatic urethra with the instillator. Even the strong solution will cause little or no pain. For the next drug—nitrate of silver—this cannot be claimed; and though it is still preferred by some, the pain, tenesmus, and bleeding are greatly objected to by the patient. If this drug should be selected, and possibly there are exceptional cases which do better under it, 1 to 5 per cent. solution should be used; a few minims of 5 per cent. solution of cocaine being instilled a few minutes after will neutralise the excess of the nitrate, and, to a certain extent, relieve the discomfort.

Sulphate of copper, iodine, and carbolic acid have been advocated by some, but reports are conflicting; argentamin and argonin are favourably reported on.

With the antrophores, the drugs most in use are thallin sulph., 5 per cent.; protargol, 2½ per cent. for the anterior, and 10 per cent. for the prostatic, urethra; and zinc sulphate, 0·5 per cent., are the only ones I have found of much benefit.

The ointment which I have found give distinctly good results is in one composed of

℞

Ac. carbolic.	10 grs.
Iodin pur.	5 ,,
Ol. olivæ	½ drm.
Lanolin ad	1 oz.

THE SURGICAL TREATMENT OF PROLAPSE OF THE UTERUS.

By Fred. Bowreman Jessett, F.R.C.S., *Surgeon to the Cancer Hospital and the Gordon Hospital for Fistula, London.*

There are few, if any, diseases peculiar to women more distressing than that of prolapsus and procidentia of the genital organs. Not only is the pain and discomfort arising therefrom, in most cases, very great, but women suffering in this way are totally disabled from following any of the active pursuits of life; in fact, in the majority of cases, chronic and permanent invalidism is the result. It is therefore very desirable to examine into the causes of the prolapse, and consider what is the best form of treatment to prevent it, or, when present, to restore the organs as nearly as possible to their normal position.

Under the heading of "Prolapse of the Uterus" we must include prolapse of the anterior wall of the vagina, cystocele, and that of the posterior wall which usually follows the rectum. Rectocele, hypertrophy and elongation of the uterus, must almost of necessity be included under the same head. The causes of prolapse may be divided into two classes—those which are due primarily to incompetence of the pelvic floor, and, secondarily, to inadequacy of the ligaments that support the uterus.

To thoroughly grasp the best method of treating this or any other ailment, it is desirable to understand, as far as possible, the cause of the ailment, before we can, with any chance of success, hope to apply a remedy. In the special subject we are discussing this appears to me to be more than ordinarily the case. It will be therefore necessary to detain you a few minutes, to very shortly examine into the anatomical relations of the uterus, how it is held in position, and why it should not always have a natural tendency to drop into the vagina and become prolapsed.

The uterus, as you are aware, in its natural position, lies almost horizontally from behind forward, the body and fundus lying on the bladder, while the os is directed almost directly backwards. The utero-vesical ligaments are so attached, that when the bladder is full the body of the uterus rises, the utero-sacral ligament, which is attached to the thinnest part of the uterus posteriorly, acting as a kind of hinge, and keeping the cervix in a fairly uniform fixed position; then, as the bladder empties, the uterus, from the natural tonicity of its ligaments, returns to the horizontal position again.

Now, so long as the uterus keeps this, its normal position, the intestines, being placed above and behind the organ, have a natural tendency to prevent the viscus becoming retroverted; in fact, if you examine the excellent illustration by Dr. Berry Hart, it will at once become clear that the weight of the intestine helps to keep the uterus in its place, and by no manner of means can it act as a cause of prolapse. I am assuming, of course, here that the pelvic floor is intact.

Should the utero-sacral ligament and broad ligament become weakened from any cause, *i.e.* from post-puerperal inflammation or posterior parametritis, and allow the os and cervix to drop, then the intestine will occupy the utero-vesical pouch, and so aid in preventing the uterus recovering its natural horizontal position; this is more particularly the case in multipara with very relaxed abdominal parietes, and by degrees the uterus becomes retroverted, the fundus occupying the sacral curve. Should, however, the utero-sacral ligament retain its normal function, and the cervix remain fixed, while the broad ligaments and round ligaments become relaxed and weakened, the body of the uterus will become bent backwards by the pressure of the intestines, and retroflexion occurs.

There often follows hypertrophic elongation of the supra-vaginal portion of the cervix. The weight of the organ becomes considerably increased, and the walls of the vagina are gradually forced to descend. The anterior wall of the vagina is usually the first to descend, forming cystocele, and is more commonly present in women who have had several children; in other cases the posterior wall of the vagina descends, forming a rectocele. In both cases the vaginal walls are considerably thickened and dilated, and have lost all their natural contractile powers; and, if left alone, the whole genital organs become prolapsed through the vulva, and great distress is caused.

In nearly all the cases, however, that we meet with, there is some weakness to the pelvic support; there has been some injury or mischief to the perineum, levator ani muscle, or pelvic cellular tissue, which is followed by cystocele, retroversion, supravaginal elongation of the cervix, descent of the uterus, and, lastly, inversion of the posterior wall of the vagina. This of necessity must lead to stretching of the uterine ligaments and general loss of tone and relaxation of these ligaments. The chief causes of this want of support may be found in impairment of the integrity of the perineum. The whole of these structures, however, may be lacerated, extending even into the rectum, while in others the muscular and fascial tissues may be only torn, there being no cicatrix to be seen behind the vaginal orifice; and even with this extent of mischief, the uterus may still continue in its normal position, supposing the uterine ligaments to retain their tonicity; yet the loss of this support will be found in a large majority of cases to be the primary cause of the eventual herniation of the pelvic contents.

Under such circumstances usually the vaginal walls will have become so distended as to have lost their natural elasticity, the surfaces become inflamed and congested, the walls become separated, and protrusion of the canal facilitated. This condition of things is far more frequent when there is laceration of the perineum, the anterior vaginal wall becoming chronically inflamed, favouring the production, first of cystocele, then of more complete prolapse.

When this condition of things is accompanied by weakening of the uterine ligaments which should retain the organ in position, then the descent of the uterus and inversion of the vaginal walls steadily proceeds.

Before proceeding to discuss the treatment of the conditions, we must remember that these displacements are constantly complicated with morbid changes in the displaced structures. Not only is prolapse often accompanied by retroversion, and more rarely by anteflexion, but much more frequently is there considerable hypertrophy of the cervix or body of the uterus, due to a chronic congestive metritis; all the walls are thickened and indurated, and the endometrium is swollen and vascular. The cervix is often elongated and hypertrophied, due to inflammatory and congested condition of the parts. This may affect the supravaginal and intermediate portions, so that the canal is often more than double its normal length; in other cases the infravaginal portion of the cervix is considerably enlarged and hypertrophied. In all the conditions, the mucous membrane lining the canal is much thickened and very vascular, so that constant catarrhal endometritis, both cervical and corporeal, is present.

Treatment.—With respect to treatment, it is obvious that our first object must be to return the displaced organ to its normal position, and then to adopt measures to retain it in position.

As a rule, there is little or no difficulty in reducing the hernial condition. In some instances, however, the prolapsed mass is so swollen and congested, that the utmost difficulty may be experienced. In such cases complete rest for a few days, and the use of the hip bath, will be necessary before reduction can be effected. In other cases peritonitic adhesion may have formed about the misplaced viscera, in which case great care must be taken not to use too great force or too rapid manipulation. So soon as the parts are sufficiently softened, and the bladder and rectum are emptied, one can proceed best to reduce the parts by placing the patient on her side, having the knees and thighs well tucked up, or by placing her in the genu-pectoral position, which will facilitate the air entering the vagina.

Should any great resistance to the replacement be present, I always give an anæsthetic, when difficulties in reduction, which may present themselves before, often entirely disappear.

Massage.—Massage has the repute in many cases of being of great service; personally I have no experience on this point, but some gynæcologists speak favourably of this form of treatment, as practised by Schultze, while Thure Brandt has also induced some members of the profession to adopt the practice, as suggested by him. All of those who have used this method seem to be agreed that, while it may lessen the frequency of surgical treatment, yet it is tedious, not quickly learnt, and that the application requires long fingers, a supple hand, muscular activity, and dexterity and inexhaustible patience. In any case this form of treatment in my opinion can but be of a palliative nature.

Packing and pessaries.—Among palliative measures may be mentioned the packing the vagina, after reduction with cotton-wool or marine lint, the cotton-wool being soaked in glycerin or glycerin and ichthyol; the object of this is to support the uterus in position, and by pressure to prevent absorption of inflammatory deposits. The tampons should be changed every three or four days; after a time, when the pelvic congestion has been relieved, a well-fitting pessary may be inserted. In cases in which the pelvic floor is intact, these may be worn with advantage, and it must be the aim of the practitioner to adopt that form of pessary which may be the most efficient. In cases in which retroversion exists, I have found the glycerin pessary, the shape of a Hodge with a large pad at the superior end, most efficacious; in others, the ring pessary has answered admirably; but for permanent wear the Smith Hodge or Thomas pessary are in my opinion the best. But I am sure that in no case where there has been complete procidentia accompanied by cystocele or rectocele, either together or separately, will any pessary be of use. In such cases, perhaps, should operative interference be contra-indicated, the best form of pessary is the indiarubber ball pessary, which the patient can introduce and blow up herself, or the author's cup-shaped pessary with a stem terminating in a cup.

Surgical treatment.—This should be had resort to in all cases in which procidentia is complete, and is much to be preferred to the use of pessaries, and with this view we must bear in mind what has been said as to the causes of the protrusion. It will be necessary to take these into consideration, and adopt measures for the restoration of the parts, as far as possible, to their normal conditions. The following are the main objects to be attained:—

(1) The state of the cervix uteri should be carefully examined, and where there is much hypertrophy, amputation of the cervix should be practised, with a view of lessening the weight of the organ and facilitating its complete reduction. (2) The perineum, vulva, and vaginal walls should be examined, and such operation as appears to be necessary for restoring these points of support should be carried out. (3) The shortening of the ligaments that suspend the uterus. (4) Hysteropexy, either through the vagina or abdomen. (5) Hysterectomy.

When the cervix, as so often is the case, is found to be hypertrophied, it will be always advisable to amputate the hypertrophied portion, or some portion of it; it may be that one or both lips, or the entire infravaginal portion, has to be removed. In doing this, care should be taken, especially in women who have not reached the menopause, to take precautions to cut out a wedge-shaped piece, allowing thereby the edges of the mucous membrane of the vagina and cervical canal to be united over the cut surfaces, so keeping the uterine canal patent. A sound should be introduced into the bladder, to serve as a guide to the surgeon when removing the hypertrophied cervix, and it must not be forgotten that often the folds of peritoneum are prolonged downwards both anteriorly and posteriorly; to avoid wounding these, the point of the knife or scissors—I prefer the latter—should be always kept directed to the part to be removed.

The next step to be taken is to restore any injury that may exist of the pelvic floor—first, as regards the perineum; secondly, as regards the pudendal aperture; and, thirdly, as regards the vaginal walls.

It is obvious that, should the perineum be torn, either partially or completely, this must be repaired, if any hope is entertained of completing a cure; to accomplish this, I think all will agree that no operation is so successful as that which was first proposed by the late Maurice Collis of the Meath Hospital, Dublin, and subsequently carried out and perfected by Tait, namely, the flap-splitting operation.

In those cases also in which there has been no direct laceration, the muscular and fascial tissues only being torn, while there is no cicatrix of the skin or mucous membrane, it will be necessary to dissect off a large wedge-shaped piece of the mucous membrane, and, by deep sutures, bring the torn muscular and fascial tissues intimately in apposition, leaving the sutures in a sufficiently long time to assure perfect union.

The vaginal walls, which in all extreme cases, accompanied by cystocele or rectocele, or both, are very much thickened and stretched, means must be adopted for narrowing the hernial canal; it must not be forgotten, however, that the mere narrowing of this canal, and repairing the perineum, will not in themselves prevent recurrence of the protrusion, which is also due to changes which have taken place in the uterus and its ligaments; but, on the other hand, unless the canal is considerably constricted, all methods which might be adopted for fixing up the uterus will be abortive.

Colpoperineoplasty.—Numerous ways for causing contraction of this canal have been suggested. The creating of a circular ulcer by means of the actual cautery, thus producing cicatricial ring, have been practised, but with no very encouraging results. I have adopted, in some cases, the plan of using the actual cautery, making deep longitudinal eschars, radiating from the cervix to the vulva, as many as six or eight, these extending the whole length of the vaginal walls; this method certainly has a very marked effect in reducing the calibre of the vagina; it has, moreover, I think, distinct advantages over the plan of dissecting long strips of mucous membrane from the vagina and uniting them by continuous sutures, as practised by Martin. The same object may be attained in cases of retroversion, distinct advantage being gained by dissecting a longitudinal diamond-shaped strip of mucous membrane off the anterior wall of the vagina, and suturing this. This dissection should begin close to the cervix uteri, widening as it goes down, till, in the middle, the entire breadth of the wall is denuded of its mucous membrane, and narrowing again as it comes down toward the urethral orifice. A continuous catgut suture closes the wound in stages. Introduced at the urethral end, it narrows the raw surface, as it is carried from side to side, till it reaches the cervical end; as it is carried down again towards the lower extremity, it brings the sides of the wound together near the mucous membrane at its widest part; and, in its third stage, as it is again passed upward, it will bring together the mucous membrane at the margins. I agree with Simpson when he says this operation narrows the anterior wall, constricts the vaginal canal throughout its length, and, when conjoined with perineal repair, gives the surest hope of a radical cure in the great run of cases of prolapsus uteri. Numerous operations for colpo-perineoplasty have been suggested by Hegar, Martin, Tait, Dolens, Bischoff, and other gynæcologists, but they all aim at the same end, and it is needless to weary you with them. Suffice it to say, that every case must be dealt with on its merits, and the surgeon must use his own judgment as to what form of operation he will adopt in any special case.

Shortening the ligaments.—The third indication in treatment is that of shortening the ligaments which suspend the uterus, or of adopting some form of operation for its suspension. The shortening of the round ligament was first introduced into this country by Alexander and Adams, and the operation is commonly known as Alexander's operation. Doubtless, in many cases of retroversion in which there are no adhesions, this is a very simple and good operation, but in cases of prolapsus, where the whole of the uterine ligaments are relaxed, this measure by itself is, in my opinion, quite inadequate, and I am strongly of opinion that nothing short of vaginal or abdominal hysteropexy will be of any service. Of colpo-hysteropexy, however, I have had but little experience, and I am strongly in favour of opening the abdomen, and being guided by the state of the uterus and its ligaments. I think this operation is better, if for no other reason than that you can deal with any adhesions which may exist, you have a thoroughly good view of all the parts; and if the patient is placed in Trendelenburg's position, and Doyen's abdominal retractor used, the condition of all the ligaments can be ascertained.

Hysteropexy.—Gastro-hysteropexy as usually performed is, I consider, insufficient to retain the uterus in place; in the first place, if the surgeon trust merely to fixing the uterus to the abdominal wound, he will find, notwithstanding he may have either previously or as a secondary operation repaired the points of support in the vagina and perineum, that the uterus, merely from its own weight, will gradually drop and become elongated, the peritoneal attachment to the abdominal parietes will stretch, and matters in many cases, in time, will become as bad as before the operation. It is absolutely necessary, at the same time as the uterus is fixed to the abdomen, to attend to the ligaments of the uterus. Moreover, in all cases of complete prolapse accompanied by rectocele and cystocele, either one or both being present, the walls of the vagina will have been so thickened and separated that, although the uterus may be drawn up and fixed to the abdominal wall, there will be found to be a great amount of bagging in the vagina, which will drag upon the os and cervix and tend to draw the whole uterus down; to guard against this, the round ligaments should be shortened by doubling them upon themselves and fixing with silk sutures, but more especially the utero-sacral ligament must be restored by drawing up the peritoneum in Douglas's pouch, and fixing it to the parietal peritoneum lining the sacrum. This will be more necessary in those cases of procidentia of the rectum and posterior wall of the vagina, in which the peritoneal covering in the pouch of Douglas is prolonged downwards into the pouch behind the uterus; in these cases it will be necessary to place several tucks in, the posterior fornix being pushed up by an assistant with a pair of long forceps. If necessary, a fold or tuck may be made in each broad ligament, and in cases of cystocele the bladder may be drawn up and stitched to the peritoneum covering the uterus.

One word as to the method of fixing the uterus to the parietes, as I consider this important. The usual plan adopted is to pass one or two sutures through the fundus of the uterus at its upper point, and fixing it to the parietal peritoneum. This I consider wrong, and not based upon scientific principles, for by doing so the uterus is kept in more or less a vertical position, which is not a correct position. The uterus should be restored to its normal horizontal position as much as practicable; this can only be done by passing a couple of sutures, some half an inch below the fundus on its posterior aspect, the sutures being passed well into the muscular substance, and passing the sutures in the parietes, which should be of fine silk, as near to the pubes as practicable, the sutures being passed through the fascia and recti muscles, so as to have a good firm hold, and not allow of any separation of the peritoneum.

If this plan of procedure is properly carried out, I think we shall attain as nearly as possible to a radical cure of the disease.

Hysterectomy.—The final plan of treatment, namely, hysterectomy, is very rarely requisite; but in some old women, in whom the uterus is found to be quite outside the vulva, the os ulcerated, and great pain existing, I think that hysterectomy is the best practice, as the operation itself causes but very little shock to the patient, and the organ being useless as an organ, there can be no reason why the patient should not be relieved from her suffering with the least possible risk to her life.

I have purposely, in the scope of this paper, avoided alluding to the practice of other gynæcologists, but have based my remarks solely upon cases that have come under my own observation. I have no doubt that some of my views are open to criticism, but I am still open to learn and to listen to any improvements in surgical procedure, or other form of treatment, which others have found to be of service in relieving women who may be suffering from this most distressing and troublesome ailment.

CLINICAL RECORDS.

A CASE OF CONGENITAL DISLOCATION OF THE HIP-JOINT AND SPINA BIFIDA.

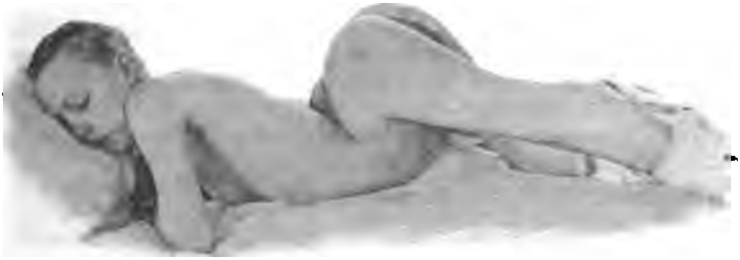
By D. C. Bremner, M.B. (Edin.), *Bishop's Castle, Shropshire.*

The case is interesting as an instance of arrested development in two parts of the body.

Case.—The patient, a girl, æt. 13, was admitted to the Workhouse Infirmary in July 1900, with the history that ten days previously she had been confined to bed with a cold, and that two days before admission an ulcer had appeared on each leg. The latter part is quite impossible, as one was about 4 in. square, and the other nearly as large, both very unhealthy, and discharging an enormous quantity of fœtid pus.

The family history is difficult to obtain. The father died of phthisis; the mother is alive; a brother and sister died young, the cause of death being unknown; and an uncle has a hare lip and cleft palate.

Previous to admission, she had been able to get about fairly well with crutches. When examined, her general vitality was very low—in fact, it was doubtful whether she would survive more than a few days. There were extensive sloughing bedsores on each hip (which have since practically healed). The spinal column shows a slight lateral curvature, with its convexity towards the left side. From the lower lumbar region, the spine takes a sharp curve backwards, the sacrum and pelvis forming almost a right angle with the dorsal and upper lumbar vertebræ, and the pelvis is correspondingly tilted and inclined somewhat towards the left side.



Situated in the lumbo-sacral region is a spherical swelling about the size of a cricket ball, of which one-third is to the left and two-thirds to the right of the middle line. It gives a sense of fluctuation, and there is a faint impulse on coughing. It is covered with normal skin, and on deep palpation, one can indistinctly make out in the middle line a hollowing out surrounded by a ridge in the bone as if it communicated with the spinal canal. Firm pressure causes a good deal of pain, which makes a thorough examination difficult.

From the tilting forwards of the upper part of the pelvis, the abdomen is very prominent, forming a sort of pendulous belly.

On the left side, the femur is flexed on the pelvis and rotated outwards, the patella pointing at about a right angle to its normal position, and the dorsum of the foot looks outwards and backwards. The head of the femur can be recognised, its rounded surface forming a prominence under the skin on the dorsum ilii. Separated from the head by what is evidently the atrophied and shortened neck, the great trochanter can be made out below and behind the head. It is well above Nélaton's line. The knee-joint is almost completely ankylosed and hyperextended, and there is extreme talipes equinus. The ulceration on the front of the ankle has already been referred to.

On the right side, the thigh is flexed on the hip to a greater extent than on the opposite side, the knee, which is also flexed, occupying a position in front of and in contact with the left knee. Movement at the hip is very limited, especially in extension and abduction. The condition of things at the joint is not easy to determine. There is no bony prominence under the skin corresponding to that on the opposite side, and on tracing the course of the femur upwards one can feel an enlargement which must be the great trochanter, but which, unlike the left, is below rather than above Nélaton's line.

The attitude of the right lower limb is probably the result of an effort made to counteract the shortening of the left leg, a shortening which has in part been lessened by the pointing of the toes of the left foot, and the hyperextension of the knee. The flexion of the right thigh and knee has the effect of bringing the toes of the left side to the ground more or less at the same level as the right foot.

I believe the right hip is not dislocated, but has assumed its present position as a compensatory change.

There is complete loss of sensation on both sides below the knee, the power of moving both legs is slight, and the patellar and plantar reflexes are absent. Since birth, she has never had any control over the bladder or rectum. Since her admission, she has steadily improved as regards her general health; the ulcers and bedsores have practically healed; and she is now (January 1901) beginning to get about again on crutches, though, after her long illness, she is rather disinclined to trust herself to them. Her other symptoms remain unchanged.

The main points of interest appear to be:—

1. The combination of the two deformities in the same individual.

2. The recuperative power displayed by the patient under tonic treatment.

3. The symptoms and signs which may be attributed to each condition—the spina bifida causing the paralysis of motion and sensation in the legs, and the incontinence; and the dislocated hip accounting for the state of the spine, pelvis, and lower extremities, including the talipes of the left foot, which appears to be more of mechanical than paralytic origin.

The photograph from which the illustration was prepared was kindly taken for me by Mr. Malcolm A. Smith, M.R.C.S.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

The Nervous System and its Constituent Neurones, designed for the use of Practitioners of Medicine and of Students of Medicine and Psychology. By LEWELLYS F. BARKER, M.B., Associate Professor of Anatomy in the Johns Hopkins University. New York: D. Appleton & Co.

IT is difficult, within the limits allotted to a review, to do justice to this remarkable book, which will probably at once occupy the premier position amongst English works on Neuro-Histology. The novel and also the important feature of the book is the adoption by the author of the neurone theory of Waldeyer as a general basis for the description of the histology of the nervous system. In spite of the extreme difficulty involved in this method of treating the subject, the author has been eminently successful, and it is probable that he will be found to have done a service to both professional neurologists and other readers, of which it is difficult to overestimate the value.

The work opens with a scholarly description, which occupies sixty-five pages, of the development of the neurone concept, treated from a historical standpoint. The author sums up what is meant by the "neurone concept" as follows:—"The nervous system, aside from its neuroglia, ependymal cells, blood vessels, and lymphatics, consists of an enormous number of individual elements, or neurones. Each neurone in its entirety represents a single body cell. These units are first *entirely* (if protoplasmic bridges be excepted), and continue throughout life *relatively*, to be morphologically, and in part at least physiologically, independent of one another." The quadruple foundation of the neurone doctrine is then stated and critically examined—"(1) The *a priori* probability that the nervous system agrees with other parts of the body in being a cellular system; (2) the proof that in the embryo the nerve cells exist as independent units . . . ; (3) the fact that . . . in pathological degenerative processes, affecting a given unit or set of units, degeneration of a given type extends only within the limits of that unit or set of units, any degeneration of other units being of an entirely different nature . . . ; and (4) the histological demonstration of the fact that . . . sometimes one unit, sometimes another, may be picked out by a particular method of staining or impregnation, and brought exquisitely into view . . ." With reference to (4), the author refers at length to the researches of Held and of Apáthy, and considers that the work of the former author is confirmatory of the neurone doctrine, though it shows that in many instances a much more intimate interneuronic contact exists than has hitherto been accepted. He, however, finds considerable difficulty in reconciling the work of Apáthy with this doctrine. The view of Apáthy that the nervous system contains elementary fibrils or neurofibrils, which pass through several nerve cells, is lucidly described, "The nervous system is composed of two varieties of cellular elements entirely different from each other, 'nerve cells' and 'ganglion cells';

. . . a neuro-fibril in turn passes out of a process of a 'nerve cell,' and then goes through a number of 'ganglion cells,' and ultimately, after leaving the last 'ganglion cell,' with which it is connected, passes more or less directly to a muscular fibre or to a sensory cell." The work of Apáthy has been hitherto chiefly carried out on invertebrate tissue, and his conclusions cannot therefore be properly applied to the nervous system of vertebrates. The author is, however, obviously much disturbed by it, and is in his discussion rather inclined to hedge instead of meeting the difficulty openly. "That the neurone conception, as it has been held by many, would have to be materially altered, there can be but little doubt, but many views of the neurone conception, and what Waldeyer actually defined it to be, are by no means identical." He finally, however, somewhat triumphantly sums up the discussion as follows:—"As yet it is altogether too early to pass judgment upon Apáthy's views; much work must be done by his methods by other observers before the exact value of his findings can be properly estimated; but, were all his statements true, is there any reason to doubt that neurones will continue to degenerate as units, as heretofore; that the nervous systems of our children will continue to be built up during development of repeatedly dividing neuroblasts in the way with which we are familiar, or that Golgi's method in the thirtieth century will have lost its power of demonstrating here and there a particular nerve unit or neurone in its entirety? Again, would the confirmation of the existence of continuous fibrils, or fibre systems, passing through a whole series of nerve elements, necessarily militate against the unitary conception? I must say that I can see no reason why it should. Waldeyer, in his article in 1891, after discussing the probable modes of conduction by means of the neurones, added, it would seem almost with prophetic insight, the following statement:—'If we assume, with Golgi and B. Haller, the existence of nerve networks, the conception is somewhat modified, but we can still retain the nerve units. The limits between the two nerve units would then always lie in a nerve network, and not, anatomically at least, be exactly definable with our present methods . . . One might just as well assert that there are no organs in the body because there is a general vascular system. . . ." This part of the book has been referred to at length, as the neurone concept is the basis on which the author has written the work, and with it must, at least in its present form, stand or fall.

The author then describes the morphology, histogenesis, physiology, and pathology of the neurone. The account of the external morphology of the neurone needs only the shortest reference. It is excellent and complete. The author purposely omits any detailed reference to the sheaths of the axone and to the peripheral nerves, but he refers fully to the recently published view of Nissl, that in the grey matter of the central nervous system there exists a special morphological constituent, of an extracellular fibrillary nature. "To this intercellular substance, together with the neuro-fibrils in the protoplasm of the nerve cells and their processes, he attributes the highest functions of the nervous system." The author would not be much surprised if the view of Nissl were correct, "for in other tissues we have not a little evidence that intercellular substances play an important rôle in physiological processes."

Under the heading of "internal morphology," a most excellent description of the stainable substance of Nissl is given, and this is followed by an equally clear and full account of the "unstainable substance" of the nerve cell, the researches of Bethe and of Held being fully referred to. As regards the possible function of these different parts of the cell, the author says:—". . . *We do not know* the exact histological mechanism in the protoplasm of the neurone underlying the conduction of what we call nerve stimuli, and we should be willing to confess it." This valuable section of the book concludes with a short and clear summary of our present knowledge of the internal morphology of the neurone.

The section on histogenesis begins with a short but satisfactory account of the general development of the central nervous system and of the peripheral sensory neurones and sympathetic neurones. In the latter the author refers to Dogiel's description of the structure of the spinal ganglia, namely, that sympathetic nerve-endings arborise around certain spinal ganglion cells, the axones of which break up inside the ganglion to form "a fine pericellular arborisation about the spinal ganglion cells of the ordinary well-known type." The section is completed by a clear and well-illustrated account of "the mechanical factors of development and the human body as a segmented organism."

In the first part of the book there is finally contained a section on the physiology and pathology of the neurone. An excellent general description of primary and secondary degeneration is given, and this is followed by a highly speculative chapter, entitled "The Irritability of the Neurones," which is very German in type. This section of the work concludes with remarkably complete and lucid descriptions of the functions of the neurone, and of the effects on it of fatigue and of toxines, the effects of the latter being compared with those following traumatism. Excellent illustrations, many of which are original, are introduced, and the author draws attention to the relatively great importance of the "unstainable substance" of the cell compared with that of the Nissl granules. ". . . Changes in the chromatic substance alone, as many have long suspected, do not suffice to account for the clinical phenomena associated with them . . . the function of the cell . . . must be intimately associated with the integrity of what we call the achromatic substance. . . . None of the methods at present at our disposal suffice, however, for more than the discovery of what must be relatively extremely gross alterations in the structure of the nerve cells."

This portion of the work cannot be too highly praised, and though it constitutes only a third of the volume, it is a masterly description of our knowledge of the intimate structure and functions of the neurone, of which any neurologist, however great his reputation, might justly be proud. In the next edition of the work it is to be hoped that the author will complete this part of his subject by adding a chapter on the chemistry of the nervous system.

The remainder of the book is a systematic exposition of the structure of the nervous system based on the neurone theory, the general order adopted being that of the afferent or sensory, the efferent or motor, and the intermediate neurone systems.

Under the afferent neurones the author first treats fully the various peripheral groups, beginning with sensory localisation. He here draws attention to the close resemblance existing between the sensory areas shown in Dana's diagrams (1887) and those published subsequently by Head, Thorburn, Starr, etc., and fully illustrates and discusses the views of Sherrington and of Head on sensory localisation. The peripheral endings of the lower neurones are next clearly described, and numerous excellent illustrations are given, the author having ransacked the literature for this purpose with a most happy result. The central axones of these neurones are then followed inwards, the results obtained from embryological studies being treated separately from those derived from the study of secondary degenerations. The peripheral neurones of the special senses are then fully described, and in this account entirely separate descriptions of the vestibular and cochlear nerves are given. This division of the work could not well be better written in the present state of our knowledge, and all the researches which have been carried on up to the present time are clearly described and critically examined in a most judicial manner.

The higher afferent neurones are then exhaustively treated in a manner which is beyond criticism, the accounts of the neurones of Clarke's column and Gowers' tract, the central tract of the vestibular nerve, the cerebello-cerebral paths, and the fillet being especially excellent. The description of the hypothalamic region, as might be expected, is only moderately clear, and would be indifferently understood by a beginner. The author next describes the higher afferent neurones of the special senses, the descriptions of the olfactory and optic systems being remarkably good.

The next subsections of the book contain equally good accounts of the lower and upper motor neurones, and the work concludes with a separate subsection on the telencephalic neurones, under the usual headings of projection, commissural, and association systems, a separate chapter being devoted to the consideration of Flechsig's doctrine of association centres.

The only important omissions in the subject matter of the second portion of the volume are the absence of any reference to the sympathetic system of neurones, on which such important researches have been done by Langley and others, and of any adequate reference to cortical lamination, which also has received a large amount of attention during the past thirty years.

The book also exhibits certain defects which necessarily occur in the first edition of such a work as the present. There is no index of pages from chapter xxvi. onwards, which makes it exceedingly difficult for the reader to find the chapter he wishes. In certain of the descriptions, also, page references would be of great value, *e.g.* on p. 559, subdivisions *a*, *b*, *c*, and *d* are referred to, and considerable time is wasted in finding these on pp. 560, 581, 590, and 605. Also, in view of the fact that the author throughout uses Latin terms, which are frequently new, for the different tracts, an index of these, with the usual equivalents, would have been of the greatest assistance to the reader. As examples of these terms may be cited "fasciculi cerebro-spinales" (pyramidal tracts), "fasciculus spino-cerebellaris dorso-lateralis" (direct cerebellar tract), and "fasciculus longitudinalis medialis" (posterior longitudinal bundle), etc.

The illustrations are remarkably free from error, considering their number and complexity. There is, however, a mistake in the colour of Goll's column in Fig. 399. The large number of horizontal sections through the bulb of the new-born babe, from preparations by Dr. John Hewetson, are confusing at first, but are well worth careful study. The copious references to literature which the volume contains are also worthy of mention.

As a whole, the work is a masterly exposition of the minute structure of the nervous system, which will be of the utmost value to the neurologist. J. S. BOLTON.

Arsenical Poisoning in Beer-Drinkers. By T. N. KELYNACK, M.D., and WILLIAM KIRKBY, F.L.S. London: Baillière, Tindall, & Cox. 1901.

THIS book contains an interesting account of the recent epidemic of arsenical poisoning amongst beer-drinkers in the Midlands and North of England.

The authors have had abundant opportunity of studying the disease clinically, and their account of the various symptoms and manifestations presented by sufferers is exceedingly full, and well illustrated by photographs showing the most striking appearances. The chemical aspects are not so fully dealt with, but this question will no doubt receive consideration from the chemists who have been concerned in the detection of the poison. The authors, however, agree with others as to the unsatisfactory results obtained by the processes of Marsh and Reinsch, when arsenic is present in very minute quantity in a complex organic liquid such as beer.

They therefore employed Gutzeit's test, which is stated to indicate the presence of arsenic when it exists in such minute proportion as 1 in 7,000,000. It is difficult to believe that such small quantities of arsenic present in beer could have produced the results stated to have occurred in many of the patients, and we cannot help thinking that the whole truth has not yet been discovered in regard to the cause of the epidemic.

We must, however, congratulate the authors on their work, which will undoubtedly stimulate further investigation into many interesting questions which are raised by the clinical manifestations of the disease, in relation to peripheral neuritis; while from a medico-legal standpoint, our knowledge of chronic arsenical poisoning is considerably enhanced. A bibliography, extending to twenty-five pages, is a valuable adjunct to the volume, although it is by no means a complete record of the literature of the subject. HARVEY LITTLEJOHN.

Lepra Bibliotheca Internationalis opera consociata virorum. Edita à ERNEST BESNIER, KARL DEHIO, EDVARD EHLERS, ARMAUER HANSEN, JAMES NEVINS HYDE, JONATHAN HUTCHINSON, ALBERT NEISSER. London, J. & A. Churchill; Leipzig, J. A. Barth; Paris, Masson et Cie. Vol. I., Fasc. 1, 2, 3. 1900.

No complaint can henceforward be made that the study of the leprosy problem will be in the future carried out in a haphazard way, for, with a journal devoted to its investigation alone, every opportunity will be afforded to facilitate the unravelling of the secrets regarding its origin, its intimate nature, and its mode of diffusion, which still obstinately elude discovery. The array of distinguished leprologists under whose auspices it appears is a long one, and those included are drawn from at least many of the lands in which this scourge is endemic or occasionally encountered. Among numerous original articles we find the commencement of two of much importance, one, "On the Visceral Disorders of Lepers," by Schaeffer, and another on "The Spinal Cord, the Peripheral Nerves, and the Cutaneous Macules in Macolo-anæsthetic Leprosy," by Voit. Judging from the portions published, it is evident that an exhaustive survey of the questions involved will be provided. Scholtz and Klingmüller descant on attempts at cultivation of the lepra bacillus and on the so-called "leprin," and their conclusions go to prove that so far the organism has not been grown in any media, and that leprin is not a substance corresponding to tuberculin. Ehlers gives an interesting historical account of the treatment of leprosy by mercury, and, while adducing proof of its value in leprosy, supports his theorem from the benefits derived from it in the cognate diseases, syphilis and tuberculosis. There are selections from the literature of leprosy culled from many sources, while the illustrations are plentiful and well executed. Whether leprosy *per se* will prove a large enough subject to afford material for its exclusive study in a periodical appearing at intervals of several months, remains to be seen, but there can be no doubt that the venture has been ably launched, and we cordially wish it success.

W. Allan Jamieson.

Clinical Examination of the Urine and Urinary Diagnosis. By J. Bergen Ogden, M.D. Philadelphia: W. B. Saunders & Co. 1900.

This work is intended to serve as a clinical guide to practitioners and students of medicine and surgery, who will find in its pages a large amount of useful information which cannot fail to prove of great service to them in their work. The subject is treated throughout from a clinical rather than a pathological standpoint, and there is little reference to the many interesting problems of metabolism which arise in connection with the changes met with in the urine under morbid conditions.

The book is divided into two distinct portions. The first part treats of the various constituents of urine, both normal and abnormal, and a selection is given of the processes which are employed for their detection and quantitative estimation.

In a short review of a work such as this, in which there is so much that calls for praise, it is difficult to indicate the points which invite criticism, without appearing to give to them undue importance. It should, however, be pointed out, that the sections on albumoses and peptone are capable of improvement in subsequent editions. The Bence Jones proteid, the diagnostic importance of which can hardly be regarded as any longer open to doubt, receives but scant notice, and the impression is distinctly conveyed that in the so-called "peptonuria," the peptone of Kühne is the abnormal constituent present. Again, whereas no less than three pages are devoted to the bases described by Griffiths as present in the urine in various diseases, the only reference to the rare but interesting condition known as alcaptonuria is the mention of "alcapton" in one place as affecting the colour of the urine, and in another as one of the reducing substances which it may contain.

The second part deals with the condition of the urine in various diseases and the diagnostic indications thereby afforded. This constitutes a special feature of the work, and the descriptions given bear witness to a very large amount of personal observation on the part of the author, who has here collected together much valuable information which, as far as it can be found elsewhere, is only to be met with scattered through works on medicine and surgery.

The large number of morbid conditions in which the occurrence of albuminuria is described is very striking, although in many instances the quantity of albumin mentioned is "the slightest possible trace." On reference to an earlier section, this is found to signify the smallest amount which can be detected by the nitric acid ring test, as performed in a wine-glass, instead of in the usual way in a test tube.

The classification adopted is in places open to criticism, as for example the inclusion of hæmoglobinuria and uræmia among "diseases of the urinary tract below the kidney proper."

The whole forms a handsome and well-printed volume of 416 pages. The illustrations are numerous, and include nine coloured plates. Many are original, and others are taken, with due acknowledgment, from other works. There is a fairly full index. A. E. Garrod.

Food and the Principles of Dietetics. By Robert Hutchison, M.D., M.R.C.P., Assistant Physician to the London Hospital. London: Edward Arnold. 1900.

Dr. Hutchison's work is one which deserves the careful attention of all who are engaged in medical practice. It presents, in a most readable and interesting form, the main facts and chief views respecting the nature of various foods and the principles of dietetics. The first three chapters are devoted to various chemical, physical, and physiological considerations respecting the nature and amount of food required in health. Here we are glad to observe that Dr. Hutchison gives a note of warning with regard to the custom, now becoming so common, of estimating the value of various foods in health and disease simply by the number of calories which are produced by their oxidation in the physical laboratory. We hardly think the table giving Mr. Sandow's diet is worth inserting in this section.

Three chapters are devoted to animal food, fish, jellies, soups, and beef extracts, etc. The chapter on beef extracts, beef juices, etc., is particularly worthy of the attention of medical practitioners, who are so systematically supplied by various firms with numerous preparations of this kind. In the conclusions at the end of this section, the author states that there is no doubt that they powerfully aid digestion by calling out a flow of gastric juice, and their pleasant flavour increases the appetite, but "the extractives of meat are incapable either of building up tissues or of supplying the body with energy, and are therefore not foods." Three chapters are devoted to milk, to foods derived from milk, and to cheese and eggs. The various forms of carbohydrate food, and the chief alcoholic and non-alcoholic beverages, are considered very fully and carefully, and here much information is given which is rarely contained in other works. Two useful chapters are devoted to the cooking of foods, and to digestion in health. Then follow three chapters on the principles of feeding in infancy, and on human milk and its substitutes. Two of the most interesting chapters are devoted to feeding in disease; and finally, artificial predigested foods are carefully considered. We are glad to note the statement that there is no such thing as a diabetic diet, and that every case of diabetes must be treated on its own merits as regards diet. The advantage of beginning the treatment of all cases of diabetes, either in hospital or in a nursing home, is pointed out.

The remarks on the dietetic treatment of gout and the various forms of Bright's disease, though somewhat critical, are very practical and valuable.

It is not possible to review in detail the various sections of Dr. Hutchison's book, since the subject is so extensive. In almost every chapter questions respecting diet are discussed which have long been much debated; but the author has always succeeded in stating his own views and the views of others most concisely and clearly. The book is well written, and the references to recent papers and books on the subject of which it treats are numerous, and will be of great value to all original workers. Every chapter will be found full of interest to those who are engaged in medical practice, and we are sure that the work will be much appreciated by the medical profession. When a second edition is necessary, we think it would increase the usefulness of the book if the dietetic treatment of several diseases (in Chapters xxvii. and xxviii.) were considered in greater detail. We can strongly recommend Dr. Hutchison's book as one of the best and most thorough works on food and dietetics in the English language; it contains many valuable original observations made by the author, and we do not know of any treatise which contains so much information concerning the recent advances in this subject conveyed in such a concise and practical manner.

R. T. WILLIAMSON.

A Research into the Alleged Parasitic Nature of Eczema. By MORGAN DOCKRELL, M.A., M.D., Physician and Lecturer to St. John's Hospital for Diseases of the Skin. London. 1900.

AROUSED afresh by the introduction for discussion at the recent Parisian Congress, of the question of the Parasitic Origin of Eczema, the battle rages with renewed vigour. In the brochure before us the author directs his attack against the view enunciated by Unna, of the universality of this causation. The illustrations by Colhoun are beautiful, if not convincing, but the epigrammatic and slashing style of the letterpress, with its curt phraseology, does not commend itself as happy or attractive. Dockrell has found an organism, but not in the situation nor under the conditions laid down by Unna. He identifies his morococcus with *Staphylococcus albus*, *citreus*, and *aureus*, and ascribes the grouped arrangement in eczema to the contraction of coagulated albumin. The vesicle, he states—and in this other recent observers bear him out—never contains in the pure serum any coccus, but in the serum generally, from true eczema, one or more varieties of staphylococci are encountered. One might cavil at his expression "true eczema," as that is just *the* point on which opinions widely differ. "What is eczema?" is like "What is truth?" its exact estimation depends on the frame of mind of the individual observer. That organisms do play a part in the causation and the course of many forms of disease classed as eczema, there can be no doubt, though what the precise rôle is, may still be *sub judice*, and therefore we are not prepared to admit the validity of his theorem thus formulated, "that there is not a shred of evidence to support the theory that the disease is produced parasitically," for the reason assigned, namely, "because a pure uncomplicated eczema never behaves in the manner which we are in the habit of regarding as a parasitic disease from a clinical point of view." Our preconceived ideas as to the nature of disease receive constantly rude shocks, and while we cannot accept unreservedly, with Unna, that all eczemas are parasitic, we are still less inclined to admit that Dockrell has at all proved that they are never so. W. ALLAN JAMIESON.

The Syphilis of Children in Everyday Practice. By GEORGE CARPENTER, M.D., Physician to the Evelina Hospital for Sick Children. London: Baillière, Tindall, & Cox. 1901.

THIS little book is the fourth volume of the "Medical Monograph Series," and its contents are based upon the study of about six hundred cases of congenital syphilis, met with at the Evelina Hospital for Sick Children. While not claiming to throw any striking new light upon the subject of which he has made a special study, the author has produced a volume which well repays careful perusal, in which the lesions and symptoms of congenital syphilis are carefully and clearly depicted. The cutaneous manifestations are exhaustively treated, and copiously illustrated, but the utility of non-coloured plates of skin conditions is very questionable, except in so far as they show the shape and distribution of the eruption. In discussing the lesions of the internal organs, the writer states that the liver was affected in 47 per cent. of his cases, and that it was very exceptional to find the spleen enlarged apart from the liver.

A most interesting account is given of the affections of the osseous system, in which the epiphyseal, the periosteal, and the other bony lesions are carefully reviewed. The author believes that Parrot's nodes are almost invariably of syphilitic origin, and that they are rarely, if ever, a sign of rickets pure and simple, uncomplicated by syphilis. He found craniotabes affecting the parietal much more frequently than the occipital bone, which is contrary to the general view, and he expresses the opinion that this condition is much more liable to occur in mild than in severe cases of the disease. The symptoms of syphilis tarda are too briefly discussed in a couple of paragraphs, and the volume concludes with the enumeration of a few typical and well-selected cases, and with a short but most excellent chapter devoted to considerations of treatment. G. H. MELVILLE DUNLOP.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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HYPERACIDITY (SUPERACIDITY, HYPERCHLORHYDRIA, SUPERACIDITAS CHLORHYDRICA).

ILLOWAY, in the *New York Med. Journ.*, May 25, 1901, discusses anew the question of gastric hyperchlorhydria, so common in America and Germany, judging by the frequency with which attention is publicly drawn to it by the "stomach" experts of these countries, and, in truth, now more prevalent in our islands than its literature would suggest. Illoway is a methodical observer; his data are therefore of real value.

To begin with, analysis of the recorded facts relative to the normal maximal degree of acidity of the stomach contents discloses that no exact figure can be ventured on. The normal standard for individuals varies individually. For instance, 0·1 to 0·22 per cent., 0·3 per cent., or 0·4 per cent. of acidity, due to hydrochloric acid, have been given by various authorities as approaching the normal. The average value of the total acidity of the gastric contents, under normal conditions, has been severally specified as varying between 40 to 60 in Ewald's notation. The author found in sixty-seven cases of apparently normal digestion a much higher range—92 to 46—with a mean of 62. But, as he points out, neither the sum of the total acidity, nor of the total hydrochloric acid acidity, affords much information regarding the condition present, compared with the actual amounts of hydrochloric acid uncombined with proteids. In twenty-seven of the above-mentioned cases, with presumably normal acidities, the mean proportion of proteid-hydrochlorides to the freer acids was as 100 to a little over 40, ranging from 100 : 69 to 100 : 7·8, and a range, within normal limits, of free hydrochloric acid from 4 to 51, which is as great in degree as that for the total acidities in health. Whenever the free hydrochloric acid is below 5 (Ewald's notation), the case should be considered as one of deficiency of hydrochloric acid secretion. Of the total 110 cases investigated, sixty-seven, as already stated, presented apparently normal acidity values, twenty-three evidence of hyperacidity, twenty of hypo-acidity. In twelve of the twenty-three instances of hyperacidity the free hydrochloric acid formed 50·2 per cent. of their mean total acidity, compared with an average of 40·4 per cent. in twenty-seven of the normal cases. Although the average proportion of free hydrochloric acid to the total acidity is distinctly higher among the cases of hyperacidity than among those presumably normal, the highest value shown by them works out at 60·2 of free acid in 100 of total acidity, compared with the 69 : 100 among the normal.

Hyperchlorhydria is met with in two forms, acute and chronic—the acute, sudden of onset, rapid of transition, sharply painful, soon relieved by nature or extraneously; the chronic, lasting from a month to any number of years.

In appearance, the victims of this gastric condition, as a rule, appear healthy and fairly well nourished; emaciation is rare, while obesity occasionally is present, as noted by Riegel, and shown in the person of one of Illoway's patients, a female weighing from 186 to 192 lb., according to the season of the year. Some of them eat well, others fairly; a number meagrely. The appetite fails only in those who have confined themselves or been confined to an abstemious diet, and in such almost always returns upon encouragement to eat more generously. Vomiting is rare. If present, and the vomited matters burn the gullet and numb the teeth during their passage outwards, free hydrochloric acid is certain to be largely in evidence. Tenderness on pressure is not invariable, but frequently pressure over the epigastrium produces pain. Internally, gastric digestion is more rapidly performed than in health. Although some authorities profess to have found certain peculiarities connected with the physical and chemical characters of the gastric contents in cases of hyperacidity, that this is so is very doubtful. In only one of the twenty-three hyperacid cases recorded by the author did the contents exhibit the characteristics regarded by the authorities alluded to as pathognomonic.

Observations upon the relative specific gravities of filtered specimens of stomach contents confirmed Schuler's earlier statements—in ten normal cases the mean was 1·023; in five hyperacid samples, 1·015. The author then proceeds to describe in detail the various clinical symptoms of the condition; but their acquaintance must be sought from personal perusal of his article, which indeed had not been completed when the imperative calls for press compelled the closing of its abstract.

GASTRO-INTESTINAL SYMPTOMS DUE TO RENAL CALCULUS.

STERNBERG (*Wien. klin. Wchnschr.*, April 18, 1901), discussing the subject of renal calculi from the clinical aspect, pays especial attention to the symptoms presented by the gastro-intestinal organs in connection with it; disorders of digestion commonly accompany nephrolithiasis, when the latter is chronic in form, as well as when acute. In many instances, indeed, the gastric and intestinal symptoms and signs are so predominant, that a "gastro-intestinal" variety of renal colic may be reasonably differentiated; while, on careful investigation, such cases present several points of difference as compared with the better known types. Modern medical literature contains but few references to this condition; some of the writings of the past deal fully with it. Morgagni, for instance, quoting Schaarschmidt (*Med. u. chir. Berl. wchntl. Nachr.*, 1738, S. 270) gives details of two such cases recorded by the latter observer, a Berlin surgeon who practised in the earlier years of the eighteenth century.

A female, æt. 36, stout, had retched every morning for ten years while her stomach was empty, and did the same, or was inclined to do so, when she was angered at any time. She also suffered from pain in "the back." Feelings of discomfort and weight in the stomach after meals, and sensations as if the floating ribs had been tied together, followed. "Pulveres digestivi," into which lapides cancrorum (calcium carbonate) entered, and a diuretic mixture, successfully brought about the expulsion of some calculi in the urine, and the complete recovery of the patient.

The second case, a male, æt. 50, lusty and sanguine, suffered from backache, and, when discomposed, from severe intestinal colic, vomiting, and diarrhœa. Complaining of pain over the left kidney, he was given an "antispasmodic powder," passed a small calculus, and was cured.

In some of the text-books of more recent date, mention of the gastric accompaniments of renal calculus are to be found. Ebstein observes that the gastric symptoms very frequently become prominent, taking on a gastralgic character, while it is by no means invariably the fact that the pain arising from a renal calculus presents the typical characteristics of a renal colic; often, throughout, it affords all the symptoms of gastralgia. Eichhorst also emphasises the ease with which cases of renal calculus may be mistaken for gastric disease. Leube states that detection of calculi in the urine in such cases, where all the symptoms point to stomach trouble rather than to the kidney, forms the only certain means for diagnosis.

Sternberg gives the details of two cases, treated personally, and sums up as follows:—(1) Among the common symptoms of renal colic are to be included gastric and intestinal disturbances; the latter are chiefly due to painful defæcation and flatulent colic. (2) Increased arterial tension is associated with pronounced intestinal disorders. (3) There are some cases of renal colic in which the predominant symptoms are so clearly connected with the stomach and bowel, that a special type of the lesion may be assumed, a "gastro-intestinal" form of renal calculus. (4) In many of the atypical cases, as included in the foregoing category, a fact of diagnostic value is to be found in a tenderness of the ureter over MacBurney's appendix point; while, again, characteristic changes in the urine may be long of appearance. (5) Some help in diagnosis may be gained from the diminution of the pain when the lower limbs are raised.

GASTRECTATIC DYSPNŒA AND PSEUDO-ANGINA.

ABRAMS (*Med. Rec.*, N.Y., September 8, 1900) discusses the evil-effects dilated stomachs produce upon the heart, and illustrates his deductions with a series of diagrammatic figures drawn from skiascopic photographs. Some years ago, Abrams reported an extraordinary case in which, by a voluntary swallowing of air, the patient could insufflate his stomach, and by so doing force his heart back behind the lungs, causing complete disappearance of præcordial dulness or percussion. Generally little of the stomach can be discerned on the phoroscopic screen, but two persons were met with in whom the gastric area displayed in Traube's space was considerable, and apparently normal. In one the coincident presence of nervous eructations permitted study of that phenomenon, in the other artificial dilatation of the stomach was produced by the employment of seidlitz powders. In both, the skiagrams show most clearly to how great an extent the heart is displayed by dilatation of the stomach, and emphasises the danger which may attend distension of the stomach in persons with weak hearts, or the likelihood of pseudo-angina and cardiac distress arising from the same cause.

NERVOUS DIARRHŒA.

PARISER (*Deutsche med. Ztg.*, Berlin, April 1900, No. 32) distinguishes five forms of nervous diarrhœa, due to (1) central nervous influences; (2) toxic causes, as from tæniæ, nicotin, morphina; (3) reflexes from pelvic organs, stomach, nose, or skin; (4) neurasthenia; (5) combined catarrh and neurosis.

The differential diagnosis is easy when the primary cause is pronounced, especially when the symptoms point to neurasthenia, while one of the most valuable signs is presented in persistence of the diarrhœa after adoption of a simple non-irritating dietary. The great abdominal nervous plexuses are often hyperæsthetic; mucus is absent from the stools, save sometimes in the last form on the list; other objective signs are lacking. The treatment resolves itself into,—First find the cause, then remove it!

DIAGNOSTIC VALUE OF GLUTOID CAPSULES IN INTESTINAL DISEASES, AND ESPECIALLY IN DISEASES OF THE PANCREAS.

FROMME (*München. med. Wchnschr.*, 9th April 1901) arrives at the following conclusions, after investigation of numerous clinical cases by glutoid capsules containing iodoform:—(1) If the reaction for iodine can be obtained from the saliva within three and a half to five hours after administration,—corresponding to the normal period,—not only is gastric motility healthily active, but pancreatic digestion is vigorous. (2) If seven or eight hours elapse before the reaction is obtainable, the capsules have been retained in the stomach longer, or the pancreatic digestion is weak and fails to dissolve them as quickly, as usual.

SURGERY.

UNDER THE CHARGE OF

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Surgical Treatment of Ascites due to Hepatic Cirrhosis—Epiplopexy.

The artificial production of a collateral circulation, by suturing the great omentum to the parietal peritoneum, is the procedure suggested by Talma of Utrecht, and first carried out successfully by Rutherford Morison of Newcastle. The operation is still on its trial, and the results in selected cases are decidedly encouraging. Patients suffering from cirrhosis of the liver are necessarily bad subjects for operation, and the mortality is relatively high, being probably about 10 to 20 per cent. At the same time, the individuals concerned are otherwise doomed to a life of perpetual invalidism, requiring constant treatment and repeated tappings to make life bearable. Packard and Le Conte of Philadelphïa (*Am. Jour. Med. Sc.*, Phila., March 1901) review twenty-two cases from the literature, and add two personal observations. These latter referred to patients who were operated upon at an advanced stage of the disease. One was so far benefited that there was no return of the ascites, and three large venous trunks developed in the anterior abdominal wall, but he died of heart failure and œdema of the lungs, seven weeks after the operation. The other died of uræmia, four days after the operation. Roberts of Philadelphia (*Proc. Phil. Co. Med. Soc.*, Phila., February 1901) also records two cases, both operated upon at an advanced stage of the disease, and both died—one the day after the operation, of uræmic coma; the other after an interval of six weeks. The author believes the operation should be done as soon as practicable after the diagnosis of hepatic cirrhosis is made. As regards the technique of the operation, he recommends the use of a local anæsthetic; the scraping or rubbing of the parietal peritoneum is not regarded as of much importance. The omentum should be rolled up into a sort of cord at the point of each suture, so as to prevent the stitch tearing through its friable tissue, and the stitch should include as wide an area of omentum as possible.

The Technique in Gastro-Enterostomy.

W. Peterson points out that the duodeno-jejunal junction is normally above the lowest point of the stomach, and when the stomach is dilated this difference in level is exaggerated. The entire duodenum is usually covered by the stomach, and considerable portions of the commencement of the jejunum run behind the stomach. In performing a posterior gastro-enterostomy, therefore, the afferent limb should be only as long as the distance from the duodenal junction to the site of anastomosis, an average of 3 to 10 cms. The afferent limb then naturally runs from above downwards, and there is no tendency to the formation of a septum or spur, which is the commonest cause of regurgitation. In

Czerny's clinique, this point has always been attended to, and in a series of 215 posterior gastro-enterostomies, there has not been a single case of serious regurgitation.—*Centralbl. f. Chir.*, Leipzig, May 18, 1901.

TENDON TRANSPLANTATION IN MUSCULO-SPIRAL PARALYSIS.

VON BISTE records the case of a youth, æt. 20, who was stabbed in the left forearm, the extensor muscles and the posterior interosseous nerve being divided. He was unable to dorsiflex or supinate the hand, or to extend the fingers or thumb. An attempt was made to find the divided ends of the nerve; but it was not successful. All the muscles supplied by the posterior interosseous nerve were paralysed, and did not react to faradic or galvanic stimulation. The following operation was performed:—An incision was made above the ulnar styloid process, the flexor carpi ulnaris was exposed and divided close to its insertion. An oblique incision was made at the junction of the middle and lower thirds of the forearm, exposing the extensor communis digitorum. The flexor carpi ulnaris was then drawn underneath the extensor of the same name, and stitched to the extensor digitorum in the angle between the tendons of the third and fourth fingers. The wound suppurated and healed by second intention, but, after the use of the battery and massage, the movements of the fingers improved very considerably. At a second operation, the tendon of the flexor carpi radialis was drawn beneath the tendons of the extensor ossis metacarpi and primi internodii pollicis, and stitched to the tendon of the secundi internodii. The wound again suppurated, but in spite of this he recovered the power of extending the thumb, and six weeks later he was able to perform all the manipulations required in his occupation of engine-fitter.—*Centralbl. f. Chir.*, Leipzig, May 4, 1901.

TENO-SYNOVITIS RESULTING IN CALCIFICATION.

C. BECK records the case of a tailor, æt. 42, who had noticed, eleven years before, a small painless swelling on the dorsum of the right hand. This had now attained the size of an apple, was very hard, and the skin over it ulcerated and perforated with sinuses. It was suspected of being sarcomatous, but skiagrams showed carious destruction of the third metacarpo-phalangeal joint, and the condition was therefore regarded as tuberculous in character. At the operation it was found that the extensor tendons of the fingers were fused into a mass resembling mortar, and most of them were sacrificed in removing this. The mortar-like material was composed of phosphate and carbonate of lime. There were no tubercle bacilli.—*Centralbl. f. Chir.*, Leipzig, May 4, 1901.

PRESSURE SORES RESULTING FROM INTUBATION OF THE LARYNX.

V. BÓKAY, in recording his experience of intubation in the Children's Hospital at Buda Pesth, specially refers to the damage that may result from it. In five cases the tube, at the moment of its introduction, was forced into a false passage, with fatal results. In withdrawing the tube, the author places most reliance upon traction on the silk thread which is attached to it. Most importance attaches to the pressure sores produced by the prolonged contact of the tube with the air passage. These were found in post-mortem examination in 156 cases, or 13 per cent. of the total cases (1203) submitted to intubation. Sixteen out of the 499 cases which recovered showed symptoms of pressure sores, and were therefore subjected to secondary tracheotomy. The sores were found on the anterior wall of the air passage, and in order of frequency in the trachea, thyroid, and cricoid cartilages. They varied in depth from superficial ulcers to those exposing the cartilages, and attended with perforation. The symptoms to which they give rise are coughing and blood-stained expectoration, and the difficulty or impossibility of dispensing with the tube; the more severe cases are apt to result in cicatricial stenosis of the larynx, for which thyrotomy may be required. The author recommends the use of the ebonite tubes of Ermold of New York, and makes the first attempt to remove the tube at the end of forty-eight hours. The average duration of tubage was sixty-three hours.—*Centralbl. f. Chir.*, Leipzig, May 11, 1901.

Vertebral Osteomyelitis.

Meinhard Schmidt records the case of a girl, æt. 13, who developed symptoms of the above the day after an osteomyelitic abscess had been opened over the right internal malleolus. The features consisted in severe pains in the neck, followed by paralysis of the right arm, and later by slighter paralysis of the other three extremities, as well as of the bladder and rectum. There was marked tenderness of the lower cervical vertebræ, but no swelling and no complaint of pain on pressing on the head. A median dorsal incision, made in the lower cervical region, revealed a small median perforation of the vertebral canal, from which a considerable amount of pus escaped, the flow of pus being accelerated by pressure on the muscles of the right side of the neck. The paralysis disappeared, with the exception of that of the right arm, which only improved very gradually. The wound healed slowly without the separation of a sequestrum.—*Centralbl. f. Chir.*, Leipzig, May 11, 1901.

Tuberculosis following Ritual Circumcision.

This case, recorded by R. Bernhardt, is of interest because it has been under observation for fourteen years. The tuberculous infection showed itself three weeks after the circumcision. Since the age of 4 years he has suffered from tuberculous disease of the cervical glands, and of the glands in the groin. At the age of 14, in spite of the disease in the glands, he presented the appearances of perfect health. There were still tuberculous nodules and ulcers on the remains of the prepuce, and on the glans penis, the diagnosis being confirmed by histological and bacteriological examination.—*Centralbl. f. Chir.*, Leipzig, May 11, 1901.

COLEY'S FLUID IN THE TREATMENT OF MALIGNANT GROWTHS.

WILD does not consider that the results hitherto obtained justify the trial of Coley's fluid, in any operable case of malignant disease, whether carcinomatous or sarcomatous. A recourse to it only wastes valuable time, and may render subsequent operation impossible. In cases of inoperable carcinoma and epithelioma, there is no evidence of any permanent benefit, and the treatment is by no means free from danger. In the absence of any other means of effective treatment, a careful trial of Coley's fluid is justifiable in cases of inoperable sarcoma, especially the more rapidly growing forms. A limited number of successful cases have been reported, in which the disease was of this type, and other cases in which there was temporary improvement. Further researches are desired upon the after-effects produced by erysipelas, as it is by no means certain that the effects produced by the toxines are identical with those which result from an attack of genuine erysipelas.—*Med. Chron.*, Manchester, March 1901.

MICROGNATHIA.

H. **LORENZ** (*Deutsche Ztschr. f. Chir.*, Leipzig, Bd. lvii. Heft 1) describes nine cases of micrognathia, or smallness of the lower jaw, and discusses the etiology and treatment. The deformity gives rise to an appearance described as "bird-face." The prominence of the chin is lost; the incisor teeth project forwards; opening the mouth, mastication and speech are interfered with, especially if ankylosis exists, and if unilateral there may be displacement of the larynx and hyoid to one side. He divides micrognathia into congenital and acquired varieties. The *congenital* is rarely seen, being usually associated with other developmental defects incompatible with life. The ankylosis which accompanies this variety has been found to be due to excessive development and changed direction of growth of the coronoid process and great wing of the sphenoid, or premature ossification of the lower jaw on one or both sides. *Acquired* micrognathia may follow upon periostitis or osteomyelitis of the lower jaw with necrosis; injury at birth or later; noma; tuberculous abscess in front of the ear; otitis media, etc. The bulk of the evidence points to the acquired variety being due to—(1) interference with the epiphyses, and (2) irregularities of nourishment of one-half or the whole of the jaw, brought about by one or other of the conditions referred to above. Ankylosis is usually due either to implication of the joint of the jaw or to fibrous or bony adhesion of the coronoid to the zygoma. The prospects of improving the appearance of the patient are not good. The ankylosis can be relieved by resection of the coronoid process, or of the joint. Sauer has devised a palate plate, arranged so as to push the lower jaw forward where the teeth bite on the anterior part of the plate. Few patients, however, will tolerate the apparatus long, and in the one case which improved under this treatment, the plate was worn for a year before any benefit was noticeable. Osteoplastic resection of the lower jaw has had varied success, a serious difficulty being present in the great brittleness of the bone. It, however, holds out more hope of improvement than any apparatus, especially in unilateral cases.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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New Method for procuring Abortion.

Oelschläger (*Centralbl. f. Gynäk.*, Leipzig, No. 27) describes a new method of producing abortion. A curved silver catheter, 2 mm. in diameter, is passed to the fundus uteri. A syringe, with a capacity of about 4 grms., is attached to the catheter, and by it 3 grms. of tinct. iod. are injected into the uterine cavity. The catheter is now removed, and a tampon placed against the cervix to prevent the iodine from coming in contact with the vagina. Oelschläger states that this method is uniformly successful and quite free from danger. The abortion occurs within two or three days. The iodine penetrates and destroys the embryo, while its antiseptic properties are a safeguard against sepsis.

Spontaneous Gangrene of the Legs in the Puerperium.

Wormser (*Centralbl. f. Gynäk.*, Leipzig, 1901, No. 4) has collected fifteen cases of this complication. He shows that the condition may arise from an embolism which has become detached from a diseased heart valve and become lodged in the anterior tibial artery, or from the venous system through a patent foramen ovale, or from arterial thrombosis extending from the placental site to the iliac vessels. The gangrene is usually of the dry type, and the pain as a rule very severe. A distinct line of demarcation usually forms. Wormser recommends removal of the diseased part when this has occurred. The diagnosis of the condition in the early stages depends on the presence of severe pain, discoloration, coldness, with loss of sensibility in the part.

Varicocele of the Broad Ligament.

Shober (*Am. Journ. Obst.*, N. Y., May 1901) contributes a paper on this subject. The condition is found most frequently on the left side, for the reason that whereas the right ovarian vein opens into the inferior vena cava at an acute angle, the left enters the left renal vein at a right angle. Again, valves are absent in the ovarian veins. Many causes lead to physiological and pathological disturbances of the circulation in the broad ligaments, such as inordinate sexual indulgence, inflammatory changes, malpositions of the uterus, ovaries, and tubes, subinvolution, lacerations of the cervix, resulting in cicatrices which tend to interfere with the circulation in the vaginal and uterine plexus, thus throwing a greater strain on the ovarian veins. Again, chronic constipation is a factor, as it favours obstruction in the pelvic circulation. The symptoms of the condition depend largely on the causes which are most prominent in the individual case. The characteristic symptoms are said to be a sense of weight and fulness in the pelvis, most marked about the region of the sacrum or perineum. Those symptoms are markedly aggravated by the upright position, and are almost immediately relieved when the patient is recumbent. On physical examination, per rectum, and under an anæsthetic, the dilated and tortuous veins can be felt in the broad ligament as a yielding compressible mass, which sometimes is as large as a hen's egg. The condition is nearly always found in multiparæ who have suffered from subinvolution, laceration, and displacements. As a rule the venous congestion leads to fibrous overgrowth in the ovaries, followed in some cases by cystic degeneration and sterility. The treatment depends on the complications associated with the varicocele. Rest, diet, regulation of the bowels, hot douching, may produce a temporary relief, but rarely a cure. Operative measures are called for in most cases. Shober refers to three methods of procedure, namely, excision by a V-shaped incision of the broad ligament, and sewing the edges together; a purse-string suture, and cutting away the mass; and, lastly, ligature of the veins in two places about an inch apart. The results, so far, have been most satisfactory, except in one case where catgut ligatures were employed.

THE METHOD OF REMOVING AND PREPARING PORTIONS OF TISSUE FROM THE UTERUS FOR DIAGNOSTIC PURPOSES.

BABCOCK (*Internat. Med. Mag.*, Phila., April 1901) pleads for a wider knowledge of both the value and limitation of pathological investigation by the gynæcologist. He believes that if this obtained more generally, pathological diagnosis would be of much greater value and accuracy. Without some appreciation of the methods employed in pathology, the tissues removed may be so injudiciously selected by the gynæcologist as to cause the pathologist to return a misleading report; while, conversely, the pathologist may fail to obtain a proper conception of the nature of the lesion, unless cognisant of certain clinical features in the case, and of the method employed in the removal of the specimen. He makes the following suggestions as to the character of specimen required and the method of securing it. As the characteristic changes are usually beneath the epithelium, it should include not only the surface but a portion of the deeper tissues. When necrosis is present, it is specially important to include portions of tissue beneath and at the edges of the degenerated area. Necrosis may be so widespread that only a thin peripheral band, in contact with more normal uterine tissue, gives evidence of the true nature of the tumour. Again, the tissue removed may have infringed on a malignant growth, and contain evidence only of an inflammatory or hyperplastic process. As to the method of removal of the specimen from the uterine cavity, Babcock recommends that the curette should have a sharp cutting edge, and that the cutting portion of the blade should be inclined so that it enters the tissues at slightly more than a right angle to their surface. A narrow curette on the whole is preferable, except in cases where the uterine walls are soft and friable. The curette should be introduced to the fundus, and withdrawn by a single firm stroke to the cervix. This is repeated in a systematic manner, till the organ is thoroughly curetted.

If there is a localised new growth, tissue overgrowth, or ulcerated surface that can be reached, portions had better be removed by the scalpel or scissors. It is convenient to remove the specimen in the form of a broad but thin wedge, the base being the surface of the lesion, the apex the underlying tissue. As a rule, the thickest portion of this wedge need not exceed one-tenth of an inch. It is often advisable to secure, at the same time that a wedge is removed, uterine scrapings, so that it may be known whether uterine disease is present in either portions of the cavity. As soon as possible after removal, the specimen should be placed in either a solution made by adding 9 parts of water to 1 part of formalin, or, if it be desired to study the finer and more minute alterations in the cells, Zenker's fluid[1] should be employed. The specimens should be sent to the pathologist within twenty-four hours after removal.

Resection of the Rectum per Vaginam.

Murphy (*Phila. Med. Journ.*, Feb. 1901) describes the technique of this operation, which he has successfully performed in five cases. The patient is placed in the lithotomy position, the vagina is broadly dilated, and the cervix drawn down; the pouch of Douglas is now opened into by a transverse incision. The intestines are pressed back by means of flat sponges. The recto-vaginal septum is divided down to the rectal wall by a vertical incision in the middle line, extending from the post-cervical opening and including the sphincter ani. The hæmorrhage can be controlled by forceps and compresses. The posterior vaginal wall is now dissected off the rectum; lateral and anterior retractors may now be used exposing a large operation site. The sigmoid can now be easily drawn down. The anterior rectal wall, including the sphincter, is divided up to the lower border of the tumour, and the anal segment of the rectum separated by a complete transverse incision an inch below the lower limit of the tumour. The proximal end of the rectum is grasped by a volsella, and separated by curved scissors from its coccygeal and sacral attachments up to the promontory. The meso-sigmoid is loosened sufficiently to allow a healthy portion of bowel to be drawn well down. The rectum is amputated above the upper border of the tumour; then the sigmoid and sphincter segments are united end to end by silk sutures, passed from within outwards. The incision in the anterior rectal wall is also closed by silk sutures, and the ends of the divided sphincter are united by buried catgut sutures. The sponges are now removed, and the peritoneum closed by a continuous catgut suture. The vaginal wall is now sutured with silkworm gut. A rubber drainage tube, 1 in. in diameter, is now placed in the rectum.

The advantages claimed for this operation are—(1) The posterior bony wall of the pelvis is not disturbed. (2) The field of operation is extensive, while the diseased tissue is more accessible for inspection, and

[1] Zenker's Fluid.

Potassium bichromate	2·5 grms.
Sodium sulphate	1·0 grm.
Mercuric bichlor.	5·0 grms.
Glacial acetic acid	5 c.c.
Water	100 c.c.

the operation can be carried further up than in the sacral route. (3) More perfect end-to-end approximation can be obtained than by the sacral route. (4) When the operation is complete, the parts are practically in their normal positions.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Treatment of Gastric Ulcer.

Stewart discusses at great length the whole treatment. His primary object is to combine local treatment with complete rest of the stomach from its motor and secretory functions. This he does by a very complete method of rectal feeding, varying from ten days to five weeks, during which time the patients are kept in bed. As a rule ten to fourteen days suffices, during which all food by the mouth is stopped. Thirst is relieved by morsels of ice, or by using water enemata at the cleansing irrigations. The technique of bowel feeding is as follows. Unless previously loose, the bowels are moved with 2 grs. calomel, followed by soft food. Occasionally a large water enema is used. After the bowels are quiet again, feeding is commenced at intervals of eight hours, usually 7 A.M., 3 P.M., and 11 P.M. One hour before each meal the sigmoid flexure is irrigated with a pint of warm water, which is voided in a few minutes; then, if thirst be great, the patient may have an enema of 8 oz. of saline solution. Three-quarters of an hour later the nutritious enema is given. The patient lies on his left side with knees flexed and a pillow under his pelvis. A fountain syringe is attached to a moderately firm rectal tube with a lateral eye. This is introduced as high as possible, certainly above the sacral promontory, as the sigmoid flexure is less irritable than the rectum. The author uses an enema composed of 1 drm. of somatose dissolved in water, mixed with a whipped egg and 4 oz. of milk gruel, or two tablespoonfuls of Mellin's Food. After straining through a wire sieve, the product should not exceed 8 oz.; 5 grs. of papain are now added. When rectal feeding is kept up for longer than a week, iron albuminate is added to the enema. The temperature should be a little above body heat. Excessive irritability of the anus may be met by a 2-gr. iodoform suppository, or cocaine. For the local treatment the author depends largely on the stomach tube. He washes out the stomach with warm water, and then introduces 500 c.c. of a 1 : 1000 solution of silver nitrate, which is allowed to remain in for two to four minutes. By turning the patient over this can be made to reach all parts of the organ, and is then siphoned off, and the stomach is washed out by water till silver ceases to come away. The administration of silver in pill or solution is useless. A very fine preparation of bismuth is given, mixed with 2 or 3 oz. of water. On days when silver is not used, a solution of alumnol, 1 in 500 or 250, is used. Of this 500 c.c. are introduced and siphoned off after five minutes. In very severe cases with a tendency to hæmorrhage, the tube is not used, and a solution of bismuth is given instead. For pain, fomentations are applied. The author is not in favour of the ordinary treatment with Carlsbad salts. He prefers Debove's plan of employing systematically enough non-irritating alkali to neutralise the gastric acids. For excessive vomiting he uses blisters or Preissnitz bandage, and occasionally cerium oxalate and morphia. Rectal administration of bromides is useful. For hæmorrhage he uses rest, morphia, hydrastine hydrochloride, and in extreme cases washes out the stomach with ice-cold water. He recommends great caution in feeding, subsequent to the rectal alimentation. A raw milk diet is inadmissible. In excessive acidity there is increased lab-ferment present, which causes an immediate firm coagulum, which renders subsequent digestion difficult and prolonged. The administration of alkali with milk neutralises the acid and renders curd more firm, and is harmful, as the presence of acid makes the curd more flocculent. Pancreatised milk is not coagulated, and is alone admissible. The author prefers strained milk gruel. For the first few days it is combined with alkalies, if acidity be present. It is given in tablespoonfuls every half-hour, gradually increasing dose and interval, till at the end of the fourth day 5 or 6 oz. are given every three hours. Somatose may be added. At the second week of mouth feeding, or approximately fourth or fifth week of treatment, both jellies and eggs may be given.—*Therap. Gaz.*, Detroit, May 1901.

THE TREATMENT OF LOCOMOTOR ATAXIA.

THOUGH the progress of the disease may be very prolonged, and may even for a time cease, there is never a cure. It is very doubtful if initial cases, *i.e.* where only one or two characteristic symptoms are present, are ever cured. Probably reported successes were merely cases of syphilis. True tabes is incurable; at present our treatment is purely symptomatic. Antisyphilitic measures are useless. In initial cases, with a definite syphilitic history, they may be tried, though the author has never seen any improvement. In advanced cases they are harmful, increasing weakness, and often unfavourably affecting symptoms, such as commencing optic atrophy. No other drugs have any better effect. The most useful measure is, as a rule, complete and prolonged rest in bed, which often hinders the progress of the disease. In any case fatigue and over-exertion should be avoided. The rest cure is specially beneficial for the ataxia. The second great indication is good nursing, and plenty of good rich food which contains very little fat. The third indication is frequent warm baths. The author has seen the greatest benefit from saline baths of a temperature of 30° to 32° C., given twice or thrice a week. The bath should not last longer than fifteen minutes as a rule. A six weeks' course may be repeated twice or thrice a year. Chills and wettings should be avoided, and warm clothing should be always worn. For individual symptoms, electricity, massage, narcotics, and analgesics are necessary. As regards Fränkel's compensatory exercises, Jacobsohn holds that the complicated apparatus is unnecessary. Chalk diagrams are equally useful. Many observers hold that, if carried out to excess, the exercises are harmful. In any case this treatment is only in place where the disease has come to a stand-still. When the disease is actively progressing, Fränkel's treatment is contra-indicated, and instead the patient should be ordered rest and avoidance of fatigue.—Jacobsohn, *Berl. Klinik*, February 1901.

COMBINATIONS OF TURPENTINE WITH PHOSPHORUS, IODINE, AND BROMINE.

THE authors draw attention to the possible therapeutic value of these little known compounds.

Chemically, phosphorus forms two compounds with oil of turpentine, containing respectively 9·56 and 16·84 per cent. of phosphorus. If 5 grms. of white phosphorus are added to 300 grms. of oil of turpentine, and allowed to stand for six days, a transparent resin of an amber colour, acid in reaction, is obtained. It contains a fixed quantity of phosphorus, of between 6 to 7 per cent. This resin forms, with alkalies, salts soluble in water. Earthy bases form insoluble salts. Despite the high percentage of phosphorus the compound is not poisonous. Guinea-pigs of 500 grms. weight took 2 grms. without injury, and on being killed in two or three weeks showed no visceral lesions. Men can also take large doses. Two phthisical patients took 0·75 to 1 grm. of the resin in pill form without any morbid reaction, though, during the administration, the quantity of urinary phosphorus was doubled and the general condition much improved. A rickety child, æt. 1½, received, with apparent benefit, 1 grm. of the sodium salt injected subcutaneously in ten doses.

Iodine combines immediately with oil of turpentine, with evolution of heat, so that it should be added in small quantities with agitation. It gives a brownish green resin of a feebly acid reaction. The authors employ a mixture of equal parts of iodine and oil, with the addition of a small quantity of almond oil. As guinea-pigs can take 2 grms. of iodine combined in this form, without trouble, it was administered to patients. Three men took for five days 1 grm. of iodine daily without any trace of iodism, though one of them was very susceptible to potassium iodide. The therapeutic effect was similar to that of the iodides. About 20 per cent. of the iodine seems to be retained in the tissues. A similar compound is formed with bromine, which has been given to animals.—Hulot and Ramond, *Presse méd.*, Paris, January 19, 1901.

SERUM TREATMENT OF TUMOURS.

WLÆFF treats malignant tumours by the serum obtained by immunising geese by the toxines isolated from human malignant tumours. Reports from various observers are unanimous in declaring that the serum is innocuous and useful to the patient, ameliorating the general state of health, increasing weight, relieving pain, and checking the growth of the tumours. The best results are obtained in the early stages. Several cases are related where improvement was obtained. Where the tumour does not disappear, but remains encapsuled, surgical treatment should be combined with the injections. Even in very advanced cases the serum has been able to arrest the growth for periods of eight months. In the case of a patient who had for six months had a tumour in the right breast, of the size of a small orange, and whose axillary glands were of the size of hazel-nuts, after receiving thirteen injections, in five and a half months, 7 lb. were gained in weight, and the patient was much stronger, and the glands had subsided. An excised gland showed that the tumour was a cylindrical epithelioma. In another case of mammary cancer, with involvement of the axillary and cervical glands, there was constant pain, and inability to use the arm, and sleeplessness. Weekly an injection of 7 c.c. of serum was given. After the second, the symptoms had gone; the growth was arrested. The tumour was flatter, smaller, and less painful. Similar cases are given. Wlæff concludes that the serum contains substance which the infected body lacks; consequently it causes a favourable reaction, both local and general, causing leucocytosis and physical and chemical reaction in the area of injection, leading to swelling of the injected thigh, which does not occur with injection of normal goose serum. With this serum one may hope for an absolute cure in early cases, provided the treatment is carried out long enough and is aided by surgical means. In advanced cases the pain is diminished, the general health raised, and the morbid growth is arrested.—*Journ. de méd. de Paris*, vol. xiii. No. 17.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Mammary Actinomycosis.

Mileff (*Gaz. d. hôp.*, Paris, January 1, 1901) writes on this subject. It is a rare disease in man, though common in animals. In the former, two kinds are distinguishable, namely, primary and secondary. Infection occurs in the primary form, either from propagation of the actinomycosis grains in the milk ducts, or from the penetration of those grains into the mammary tissues through a traumatic or other break in the continuity of the skin. He has collected four cases of the primary form. The secondary form spreads to the mammæ from the lung (most frequently), or some other organ. The disease is not easy of diagnosis, and is liable to be confused with tubercle, cancer, interstitial inflammation, or syphilitic disease; and repeated microscopic examination of discharges or pieces of tissue should be made. The prognosis in the primary form is good, but in the secondary form, bad.

The Comparative Pathology of the Jewish Race.

A new field of statistical inquiry was opened up by Fishberg in a paper on this subject in the *New York Med. Journ.* of March 30 and April 6. The numerous references to it already made in medical journals show the widespread interest it has excited. The Jews are proverbially a hardy race. It has been shown that, in Europe, Jews live on an average considerably longer than Christians. They show a lower death rate, a smaller marriage rate, and a smaller number of children in each family, than do Christians. There is a smaller infant mortality; fewer are born, but more reach maturity, and thus the population is kept up. Fishberg's figures show that these facts are also true of the United States. The statistics relating to disease susceptibility are equally interesting. Tuberculosis, pneumonia, nephritis, typhoid fever, malaria, and epidemic diseases generally are less prevalent among the Jews than among Christians, not only generally, but also among their more immediate neighbours. They also show a certain slight amount of immunity to smallpox, plague, typhus, intermittent fevers, epidemic dysentery, and cholera. This immunity is now much less than it formerly was; *e.g.* in the cholera epidemic in Buda Pesth in 1851, the mortality among Christians was 1·85 per cent., as against 0·257 per cent. among the Jews, the latter being seven times less. The comparatively less frequent incidence of tuberculosis amongst Jews is still very marked. A study of the mortality in one of the most densely inhabited regions of New York City for the six years ending May 31, 1890, shows that the mortality from consumption during that period reached, among the Irish, 19·44 per cent. of the death rate due to all other causes; among the Germans, 14·12 per cent.; among the English, 13·04 per cent.; among the Russian and Polish Jews, 5·76 per cent. Syphilis and alcoholism, and also diseases due in great measure to their poisons, are comparatively rare among the Jews. This may account partly for the relative infrequency of organic diseases of the nervous system, in contrast with the markedly greater relative occurrence of all functional nervous disorders, particularly neurasthenia and hysteria. The instability of the nervous system may be regarded as the most conspicuous fact relating to the diseases of the Jews. Gonorrhœa appears to be equally prevalent among Jews and non-Jews, which goes to show that their relative freedom from syphilis is not due to greater chastity. Diabetes is very frequent, as are also all the diseases of metabolism, such as gout, gall stones, nephro-lithiasis, chronic rheumatism, neuralgia, migraine, asthma, pulmonary emphysema, varicose veins, and particularly hæmorrhoids, arterio-sclerosis, and some skin diseases. Hernias are frequent, and so are blindness, colour-blindness, trachoma and glaucoma, and myopia. All these peculiarities in the comparative pathology of the Jews are not due to any ethnic, "biostatic," or racial characteristics of a purely anatomical or physiological nature in relation to non-Jews. They have their origin in the past history of the Jews, in their habits of life, and in the fact that syphilis and alcoholism have but rarely been seen among them. Where the Jew is commingling with his Christian neighbours, and adopts their customs and habits of life, he sooner or later loses his racial characteristics, and his comparative pathology presents no special peculiarities.

ON THE ETIOLOGY OF TROPICAL DYSENTERY.

FLEXNER (*Johns Hopkins Hosp. Bull.*, Baltimore, vol. xi., No. 115) gives an account of his researches, carried out at Manilla, at the instigation of the Johns Hopkins University. Two main types of the disease were met with, acute and chronic, each with its distinct pathological appearances. In the acute variety, amœbæ were either absent, or in very small numbers, while in the chronic form they were more numerous, and constantly present. In all the acute cases, in addition to the cocci and bacilli usually found in acute enteric conditions, he found bacilli of two types. Type 1 was identical with *Bacillus dysentericæ*, described by Shiga of Tokio; and type 2, nearly allied to *B. coli communis*. The organism described as type 1 was the predominating organism in all acute cases, while type 2 occurred in small numbers in all cases. Details are given of the appearances, cultural characters, and pathogenesis of these organisms. Shiga's *B. dysentericæ* differs from *B. typhosus* in (*a*) being less motile, (*b*) displaying more uniform production of indol, (*c*) after slight acid production it gives rise to increasing alkalinisation, (*d*) it is inactive to blood serum from typhoid cases, but reacts with serum from dysenteric cases, to which *B. typhosus* does not respond. He thinks that his results tend to confirm the *B. dysentericæ* as the specific cause of acute dysentery, and open up the way for attempting a method of artificially immunising persons exposed to this very fatal disease.

BACTERIOLOGY OF RHEUMATISM.

MEYER (*Deutsche med. Wchnschr.*, February 7, 1901) made cultures from the tonsils, and found regularly the presence of a diplococcus which grew in chains, and otherwise closely resembled Wassermann's organism, but was not identical with it. It was not found in the tonsils of persons who had not acute rheumatism. He got unsatisfactory results from the direct examination of the joint exudate. When the diplococcus was injected into animals, it produced a sero-purulent exudation in the joints, which was usually sterile. In about one-fifth of the animals so injected there was a verrucose or ulcerative endocarditis. The number of cases so far investigated is too small to warrant the conclusion that this strepto-diplococcus is actually the cause of rheumatism, or, if it be, that it is the only one. Menzer (*Deutsche med. Wchnschr.*, February 14, 1901) discusses Meyer's results, and says that they corroborate the observations of others, and, though important, are not new, except in the experimental findings in the joints and endocardium. He describes his own results in four cases. In two of these the exudate from the joints showed streptococci of diplococcoid form, and in three cases, one of which was one of those previously mentioned, he obtained diplococci in streptococcoid form from the substance of the tonsils. Portions of the tonsils were excised, and bacteriological preparations were made from the cut surfaces. He doubts whether bacteria will always be found in cases of acute rheumatism, capable of producing joint changes experimentally, and whether those streptococci, which so far have been found, will alone be able to do so. The organisms found in the tonsils of healthy persons must be tested in the same way, as possibly some of them may be able to produce similar changes. He considers it possible that some one form of organism among those already described will be found to be the specific cause of acute rheumatism, though it must still be considered very doubtful, owing to the close relation which rheumatism bears to atypical rheumatoid affections and to pyæmia.

BACTERIOLOGICAL DIAGNOSIS OF TYPHOID FEVER.

Scholz and Krause (*Ztschr. f. klin. Med.*, Berlin, Bd. xli. Hefte 5 and 6) give their results with some of the bacteriological methods employed in the diagnosis of typhoid fever. Scholz considers that the Widal reaction is of little value in early diagnosis. He bases his conclusions upon the investigation of only fifty-five cases, forty-seven of which were positive and eight negative. Among the positive cases there were three in which the reaction appeared only after five weeks. Among the negative cases there were two in which the last test for the reaction was made on the ninth day; in two others it was sought for on the eighteenth and twenty-fifth days, but in the remaining four the test proved negative, when undertaken between the sixty-second and the one hundred and sixth days. Krause found characteristic bacilli in the typhoid skin spots in fourteen out of sixteen cases, and considers this a more important method of examination than the Widal test, as five cases which showed bacilli in the spots showed no agglutination. He found that the bacilli may disappear from the spots within three to five days after the appearance of the spots, and that several spots should be examined, as bacilli may be absent from some of them. Media are inoculated from the spots after several moderately deep incisions into them are made, and their surface scraped. He also studied Piorkowski's method of inoculating a urine gelatin medium with the stools of suspected cases. He investigated nineteen cases, making in all 123 tests. He got a positive result in three-fourths of these cases, and failed to find the bacilli in four cases only. The appearances of plate cultures alone are insufficient, and the usual chemical and biological tests for verification must be employed. He found that the method could be more easily carried out if the urine were inoculated with the *Micrococcus ureæ* and kept in a thermostat for from twenty-four to forty-eight hours. The medium becomes fluid easily, and is not suitable for summer temperatures. He thinks that this culture medium is a valuable addition to bacteriological methods, but that its diagnostic value is much more limited.

VARIABILITY IN THE AGGLUTINATING REACTION OF THE TYPHOID BACILLUS.

Sacquepée (*Ann. de l'Inst. Pasteur*, Paris, No. 4, April 25, 1901) tested the agglutinating power of various races of the typhoid bacillus obtained from various sources. He comes to the following conclusions:—The agglutinating reaction of Eberth's bacillus is variable. Increased agglutinating power is inconstant and of short duration, but diminished agglutinating power is more important. Bacilli of the latter type are met with in nature, rarely in water, but readily in patients suffering from typhoid fever, particularly its later stages. They correspond in all details with the ordinary Eberth's bacillus, except that they give a darker coloured growth on potato, and show little or no agglutinating power. Their pathogenic effect on animals is the same. After preservation in closed tubes, they spontaneously acquired agglutinating power. On the other hand, if a strongly agglutinating bacillus be kept for a long time in contact with an immunised animal, it gradually loses its agglutinating power, and finally shows none at all. The variability in the agglutinating reaction shown by various races of the typhoid bacillus is merely a question of habit.

INTERIM REPORT ON YELLOW FEVER.

DURHAM and Myers (*Johns Hopkins Hosp. Bull.*, Baltimore, February 1901, vol. xii. No. 119) publish an abstract of their interim report, rendered advisable by the lamented death of Dr. Myers. They arrange it as follows:—(1) A fine small bacillus is found in the organs of all fatal cases. They found it in each of the fourteen cadavers examined for the purpose. As seen in the tissues, it is about 4 μ in length, and about the same diameter as the influenza bacillus. (2) It was found in kidney, spleen, in mesenteric, portal, and axillary lymphatic glands. In the contents of the lower intestine apparently the same bacillus is found often in great preponderance over other micro-organisms. Preparations of the pieces of mucus present in the stools may present almost the appearance of pure culture. (3) Preparations of the organs usually fail to show the presence of any other bacteria, whose absence is confirmed by the usual sterility of cultivation experiments. (4) It is probable that this same bacillus has been met with, but not recognised, by three other observers, probably because of insufficiently stringent staining technique. It stains with difficulty, especially with methylene-blue, and is difficult to cultivate. The best stain is carbol-fuchsin, diluted with 5 per cent. phenol solution, acting for several hours, and followed by differentiation in weak acetic acid. Two hours' staining may fail to reveal bacilli which appear after twelve to eighteen hours. The bacilli in the stools are often of greater length than those in the tissues, and they may stain rather more easily. This is also true of cultures. (5) Since the bacilli are small and comparatively few in numbers, they are difficult to find. A method of sedimentation was at last employed to facilitate this. A considerable quantity of organ juice is emulsified with antiseptic solutions; the emulsion is shaken from time to time and allowed to settle. The method is successful, and may form a ready means of preserving bacteria containing material for future study. Normal saline solution with one-fifth per cent. sublimate was employed by them, but a better may be found. (6) Pure growths of these bacilli are not obtained in ordinary aerobic and anaerobic tubes. (7) Some pure cultures were obtained by placing whole mesenteric glands (cut out by means of the thermo-cautery) into broth, under strict hydrogen atmosphere. (8) Much search was made for parasites of the nature of protozoa in fresh tissues, juices, blood, etc., with and without centrifugalisation, and none found. (9) The endeavour to prove a man to man transference of yellow fever by means of a particular kind of gnat is hardly intelligible for a bacillary disease. (10) They think that the evidence in favour of the etiological importance of the fine small bacillus is stronger than any that has yet been adduced for any other pretended yellow fever germ. The acquisition of a new bacterial intestinal inhabitant would explain the immunity of the acclimatised.

RESEARCHES ON EXPERIMENTAL VACCINE.

CALMETTE and Guérin (*Ann. de l'Inst. Pasteur*, Paris, No. 4, 1901), from a series of experiments on rabbits, find—(1) Inoculation of a rabbit with vaccine is always followed by a confluent eruption of little pustules, very rich in lymph, when the precaution is taken not to rub in the vaccine into the scarifications, but simply to spread the virulent substance on the freshly scraped skin. (2) The rabbit is an excellent animal of control, permitting the verification of vaccines received from calves, infants, as well as old glycerin-preserved kinds. (3) Multiplication of the virulent elements of the vaccine does not appear to occur in the rabbit in any other organ than the skin. (4) Aseptic vaccines can be obtained, which give rise to no bacterial growth in artificial cultures, by allowing them to remain for several hours in the peritoneal cavity of rabbits previously prepared by an injection of bouillon. The leucocytes have destroyed any bacteria which were present, and cause the virulent elements of the vaccine to be preserved for a longer time.

DERMATOLOGY.

UNDER THE CHARGE OF

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VULVO-ANAL LEUCOPLAKIA AND ITS CONNECTION WITH KRAUROSIS VULVÆ.

UNDER the term kraurosis vulvæ, Breisky described a rare disease, frequently unnoticed, commencing insidiously and progressing slowly. Pruritus is one of its early symptoms; this may be more or less marked, but that which is special to the complaint is the existence of white patches, neither prominent nor ulcerated, few in number, and located by preference near the clitoris. The vulva assumes, so to speak, the infantile type, the vaginal orifice is narrowed, the skin and mucous membrane exhibiting, particularly in the upper half of the vulva, a glossy, varnished, and almost cicatricial aspect, while the vaginal folds are effaced. To touch, the mucous membrane and skin are dry and rough. In short, itchiness, narrowing of the vulva, and white patches, make up the clinical picture of kraurosis vulvæ. Perrin (*Ann. de dermat. et de syph.*, Paris, Jan. 1901) observes that in these leucoplakias, as in those of other regions, the cause is to be sought in a chronic inflammation, set up and maintained by prolonged and repeated irritation. Microscopically, there is dermic sclerosis, and transformation of a pavement or cylindrical epithelium into a thick and horny epidermis. The affection is chronic, obstinate, and liable to degenerate into cancer, or this change may be through a previous papillomatous phase. Each leucoplakia, according to its localisation, presents several interesting problems, for the bucco-lingual the relation to syphilis, for that of the external genitals of the female that with kraurosis vulvæ. He believes he can prove that these are but two degrees of the same disease, and that early radical surgical intervention, if possible, ought to replace all topical medication. The extirpation of the leucoplakic patches should be carried out in the pre-epitheliomatous period, and the result is not only immediate but permanent. Two illustrative instances are reported in full, in support of this statement.

BLASTOMYCETIC DERMATITIS.

THE literature of this disease, of which more than a score of cases have now been recorded, all but one having occurred in America, has been made the subject of an analysis by Hyde and Ricketts (*Journ. Cutan. and Genito-Urin. Dis.*, N. Y., Jan. 1901). Except an instance related by Montgomery, where there was an elevated tumour of the lip, there is remarkable uniformity in the essential clinical and pathological features. There is a sharply raised, well-defined, slightly elevated border, composed of minute verruciform projections, commingled with small purulent points, from which pus can be expressed. On the side of the sound skin there is a bluish red sloping border, with pin-point-sized abscesses, not closely set; while on the morbid side of the enclosing wall is either a moist granulating surface, or a partially cicatrised reddish and tender disc, with here and there projecting areas made up of the verrucous elevations. The regions of preference are, first, the face; next, the lower limbs; then, in order of frequency, the hand, leg, foot, scrotum, and back. One-half of the cases showed multiplicity of lesions in other parts of the body, suggesting auto-inoculability. Evidence favours the view that the medium of infection lodges on the hand or face, and from thence is transferred to some accessible spot. It has been advanced that the process may be a form of syphilis or epithelioma, but there is little support for this idea. The distinction between it and tuberculosis verrucosa is much more difficult of determination, since the clinical features have much in common. Tuberculosis verrucosa is rarely multiple, seldom occurs on the face, and is not benefited by the administration of potassium iodide. While in a few of the cases tubercle bacilli in small numbers were found, in all a special variety of the yeast organism has been isolated and reproduced in cultures. This double-contoured and vacuolated budding organism is chiefly encountered in or near miliary abscesses, and in the epithelium in the rete, sometimes within giant cells, at others free in the connective tissue. The size varies, as it is actively growing or mature, and when cultivated according to the medium employed. Hektoen has shown that even 1 per cent. potassium iodide solution has the effect of reducing the size in artificial cultures. When this drug, as first suggested by Bevan, is administered even in moderate doses, an improvement is observed, and this is more pronounced if large quantities are given; but in no case has entire cure resulted, while the best results are obtained if with it surgical measures are combined. Dwyer (*ibid.*) remarks on the resemblance that the eruption has to that in yaws, the medium of communication in which has not yet been determined. Stelwagon (*Am. Journ. Med. Sc.*, Phila., Feb. 1901) observes, after relating a typical example, that it must be admitted that a positive and unquestioned diagnosis between blastomycetic dermatitis and certain forms of cutaneous tuberculosis can scarcely be made without histological and bacteriological investigations.

LUPUS ERYTHEMATOSUS OF THE BUCCAL MUCOUS MEMBRANE.

THOUGH isolated instances of lupus erythematosus affecting the lining of the mouth are to be found scattered throughout periodical literature, this localisation is scarcely mentioned in categorical descriptions. It seems rare, yet may have been overlooked, because the cavity in question has not been examined. Dubreuilh (*Ann. de dermat. et de syph.*, Paris, March 1901) thus formulates its characters. It commences by ill-defined reddish violet patches, slightly infiltrated, which may show slight superficial ulcerations. Rather later white cicatricial lines appear, distinct from the violaceous border. Finally, the redness tends to disappear, while scar-like mottling assumes greater importance, and the lesion is represented by a firmish white cicatrix, a round cushion with lines converging towards the centre. Such are chiefly found in the region of the back molar teeth. They seldom give rise to any sensations which attract attention. The lingual changes are less characteristic; they are reduced to smooth red rounded patches at the sides, without infiltration or pain. In diagnosis a difficulty can hardly arise, save when the cutaneous lesions are ambiguous or absent. A tertiary syphiloma manifests a harder and more limited infiltration, there is leucokeratosis on the surface and in the neighbourhood, and the trouble is habitually kept up by tobacco, and is more or less painful. As to affections of the tongue, the discrimination is for the present insurmountable; the fixity and indolence are the sole differential points between lupus erythematosus of the tongue and a bald mucous patch. In treatment, he recommends mouth washes of ichthyol or of saponified coal-tar. The complaint is very obstinate, and the prognosis is benign; hence such disagreeable remedies are not likely to be persevered with.

XANTHOMA TUBEROSUM RESEMBLING XANTHOMA DIABETICORUM.

DUHOT (*Presse méd. belge*, Brussels, Dec. 30, 1900) records a case which presents some peculiar features. The patient was a very stout man, æt. 56, who had had good health, with exception of jaundice many years previously, which had lasted some weeks. A small tumour the size of a pea, tender on pressure, appeared in 1894 on the point of the right elbow, and not till a year later did others follow. Then the other elbow, the upper arms and wrists on the extensor aspects, and the outside of the thighs, became affected. Some were as large as a walnut, on the backs of the hands as large as a filbert. Though principally yellow, some were rosy, with minute citron yellow indentations. All the lines of flexion of the fingers and palms were marked by irregular yellow lines, giving rise to slight stiffness. When the eruption first developed, the integument assumed a yellowish hue; yet the urine never contained any trace of bile pigment, albumin, or sugar. Since its appearance, complaint was made of vague pains in the legs, rendering walking irksome, and these tended to increase. Where some tumours had been excised others had come, and new ones took the place of those which had spontaneously disappeared. Kaposi holds that similar tumours may form in the liver, and occasion jaundice; and Hallopeau that they may affect the pancreas, and thus occasion glycosuria. With exception of itchiness, no mention of which is made, all the other symptoms, including the peculiar firmness and localisation about joints characteristic of so-called diabetic xanthoma, were present, without the diabetes.

THERAPEUTIC NOTES.

PEROXIDE of hydrogen is recognised as an efficient agent in the treatment of various suppurative affections, but Thiriar (*Allg. Wien. med. Ztg.*, March 12, 1901) recommends oxygen gas, injected or forced into and around *boils* and *carbuncles*, as obviating or diminishing the tendency to slough. He attaches a hypodermic needle, carried on an indiarubber tube, to the nozzle of the gas-holder, and then regulating the pressure, which can be readily ascertained by placing the point under water, he fills the tissue with the gas. If the carbuncle has opened, oxygen must be introduced into each aperture. It is necessary to surround the diseased area with an atmosphere of oxygen. There is at first rather sharp pain, evoked by the distension; but this soon subsides, and all pain ceases. The earlier the treatment is commenced, the more speedy the result; but even in advanced cases, according to him, improvement is immediate. The effect is not apparently due to any direct action on the staphylococci or streptococci, but to an increase of the power of resistance of the tissue elements themselves.

Though apparently *Tinea barbæ* seldom reaches the proportions and intensity in Britain that it does on the Continent of Europe, there are still some cases which offer great resistance to treatment. Zechmeister (*Monatsh. f. prakt. Dermat.*, Hamburg, April 1, 1901) recommends for such the employment of X-rays, as already used with success by Freund in staphylogenic sycosis. This, he believes, acts by the chemiotactic property of the rays, ultra-violet beams of the finest undulations. Levy-Dorn has shown that these rays possess a bactericidal power, since virulent cultures of cholera bacilli, *Staphylococcus aureus*, etc., are either weakened or killed by one hour of exposure. The tube to be employed must be a moderately hard one, the exposure at first short, and the distance not too near, till the individual reaction has been tested. He cites an instance where the disease had lasted two years, notwithstanding careful treatment, and was particularly deep-seated. In one month he was cured, the time of daily exposure rising from five to fifteen minutes for each cheek, the distance lessening from 25 to 15 cms.

Various methods of treatment have from time to time been recommended for *Molluscum contagiosum*, but the following, suggested by Hallopeau, and endorsed by Balzer and Alquier (*Ann. de dermat. et de syph.*, Paris, March 1901), is not only simple, apparently effectual, but is applicable to any region:—The little growth is first squeezed gently to empty it, at least partially; then the point of a match, sharpened for the purpose, is dipped in tincture of iodine, and then inserted into each tumour, embedding the point in the tissue and in several directions, should it be voluminous. The iodine dries the tumour, which becomes hard, and soon separates with some of the neighbouring epidermis. To expedite matters, the hardened mass may be turned out with the curette. A case is related where the growths were limited to the scalp, and a cure was effected in a fortnight.

A well-recognised effect of the poison of syphilis on the system is its tendency to cause arterial interference; there is generally a narrowing of the lumen, either from organic changes or vascular spasm. It appears that in these processes the muscular layer of the artery remains long intact. Hence Browning (*Med. News*, N. Y., Dec. 29, 1900) suggests recourse to the group of vaso-dilators. This applies especially to the tertiary period, and is an auxiliary and preliminary to other established methods. It is in disorders of the nervous system that these agents are specially indicated, but they may be of value in rapidly destructive lesions of other parts. Nitrite of sodium or tetranitrate of erythrol can be used at first, and continued for a time; but it is commonly necessary to fall back on nitroglycerin for prolonged use.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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SOME SYMPTOMS OF MEASLES DURING THE PRODROMAL STAGE.

IN this paper Guinon discusses the value of several premonitory symptoms as aids to the diagnosis of the onset of measles. He first calls attention to the notable loss of weight which occurs in many cases of children incubating with measles, which was first pointed out by Henri Meunier in 1898. This occurs in children in apparent health, whose weight has hitherto regularly increased week by week. The loss of weight commences on the third, fourth, or fifth day of incubation, and continues for six or seven days. The mean loss averages about 310 grms. He regards this as having an important signification, coming on as it does in a child in good health and with a normal temperature. A second sign, which was investigated by M. Combe of Lausanne, consists in a great increase in the number of leucocytes, a day or two previous to any catarrh or other premonitory symptoms. This is in marked contrast with what occurs during the period of eruption, when the number of leucocytes falls very greatly below the normal. Combe suggests that the micro-organism of measles should be searched for during the period of hyperleucocytosis, before the commencement of the premonitory symptoms. The writer does not consider that Koplik's spots, to which so much attention has recently been drawn, are nearly so important an indication of the advent of measles as an "erythemato-pultaceous stomatitis" of the cheeks and gums, described by Comby. It consists of a redness and swelling of the mucous membrane of the gums and inside of the cheeks, which are covered with a pale, opalescent, whitish epithelial coating, which coating quickly separates itself and is easily detached. This aspect he considers the rule in measles at the period of eruption, when it is a symptom of great help in the diagnosis of doubtful cases; but it precedes the eruption very often, and becomes then a trustworthy premonitory sign. Guinon regards Koplik's spots as unreliable, frequently absent, and, when they are present, they are often so slightly developed that they are difficult to recognise. The author concludes by remarking that, though all the preceding signs have a certain diagnostic value, none of them can be absolutely relied upon. When present they are of service in preventing the spread of measles in institutions, by enabling cases to be isolated early before the actively infectious symptoms have developed.—*Rev. mens. d. mal de l'Enf.*, Paris, Avril 1901.

A Study of the Lesions of the Liver in Young Children.

Freeman has brought together in this paper some valuable observations on the various lesions of the liver in infants and young children usually under 3 years old, made at the New York Foundling Hospital. He regards descent of the liver down the right side of the abdomen, so that the right lobe reaches the crest of the ilium, as not very uncommon, particularly in those in whom the organ is enlarged. It results from a stretching of the ligament supporting the right lobe, so that what should be the right side of the liver is really in the pelvis, and the left lobe is the only part of the organ remaining beneath the diagram.

Fatty livers occur very frequently in children dying in the Foundling Hospital, and they average about 41 per cent. of all cases. Some of these fatty livers are very considerably enlarged, extending below the umbilicus. Freeman's observations are quite at variance with the current views—that fatty livers are associated most commonly with the chronic wasting diseases of children, namely, marasmus, malnutrition, syphilis, and rickets. He maintains that the condition of nutrition of the child, as expressed by the absence of fat, has apparently no connection with the fatty condition of the liver. He considers that fatty livers occur most frequently in connection with the acute infectious diseases and gastro-intestinal disorders, and that they are present in a considerable percentage of cases dying of tuberculosis.

He found waxy liver to be a rare disease in young children, and he only met with two cases of this condition during the period of his investigation. Both cases were associated with suppuration, and in one case the abscess was tuberculous. In both cases the liver, spleen, and kidneys showed waxy degeneration, and the liver and spleen were greatly enlarged. Focal necrosis of the liver was found in four out of fourteen consecutive autopsies in cases of measles. This condition has not previously been described as a lesion of measles, although it has been found associated with diphtheria, pneumonia, malaria, and streptococcus infection. It is due to the local action of bacteria toxines usually at a distance from the seat of bacterial growths, and the lesion is not confined to the liver, but involves other organs. In the liver only the larger areas are visible to the naked eye, and the appearance is fairly characteristic, although they may be mistaken for tubercles. The microscopic lesion, when well marked, consists of a sharply circumscribed roundish area of necrosis.

Cirrhosis of the liver the author regards as a rare condition in children. Two marked cases were examined. In both the history of the condition was short, and there was marked ascites and emaciation, and one had jaundice. In neither was there any history of alcoholism, or immediately preceding acute disease, or of any of the conditions known as associated with cirrhosis. In both cases the livers were hobnailed and very hard on section, and the microscope showed an apparently very active interstitial change going on, consisting of an extensive hyperplasia of the interlobular connective tissue.—*Arch. Pediat.*, N. Y., vol. xvii. No. 2.

Abscess of the Liver in Children.

The following are the conclusions arrived at by Oddo, writing on the subject of abscess of the liver in children :—(1) Abscess of the liver is a rare condition in children, except as the result of injury, but traumatic abscess is relatively more common in them than in adults. (2) This relative frequency is probably due to the occurrence of blows or injuries on the abdomen, to which children are more subject than adults. (3) Sometimes the abscess developes immediately after the injury, whilst at other times a latent period intervenes, during which time the symptoms are in abeyance. (4) Generally the injury has been applied directly over the hepatic region, in which case the abscess is primary. Occasionally an abscess of the liver results from an injury to some other part of the abdomen, when the resulting abscess is secondary or indirect. (5) The symptoms of a traumatic abscess of the liver are local pain, swelling, and fluctuation ; at the same time there is fever, either remittent or continuous, and rapid and profound cachexia in every case. (6) The natural tendency of the liver abscess is to rupture, either through the skin or through the respiratory passages. In the latter case the abscess discharges either through the bronchi or into the pleura, setting up a purulent pleurisy or a pyopneumothorax. (7) The evacuation is followed generally by a rapid amelioration of the symptoms, but in every case surgical intervention brings about a more certain and rapid cure of the condition.—*Rev. mens. d. mal. de l'Enf.*, Paris, Janvier 1901.

Mongolian Imbecility in Infants.

Sutherland, in the *Practitioner*, London, vol. lxiii., bases his remarks on the study of twenty-five cases. All Mongolian idiots are marked by special characteristics, both mental and physical, by which they are easily recognised. At birth they are small, and growth takes place slowly, and at a year old the development is that of a normal baby of 6 months. Dentition is greatly delayed, and muscular power and co-ordination are so slowly acquired that the child can neither walk nor talk till five years old. The skull is small and shortened antero-posteriorly, due either to premature ossification of the basilar bones, or defective growth in the structures at the base of the brain. There is probably also some change in the higher nerve centres, which has not yet been discovered. The fontanelle is late in closing. The face is small and rounded, but often the features are swollen from an excess of fat. The bridge of the nose is flat or sunken, and the epicanthic fold, which forms owing to the redundancy of the skin, gives an appearance of increased distance between the eyes. The cartilaginous part of the nose is broad, and the alæ are extended, with the openings of the nostrils directed upwards. The eyes appear small, from the narrowness of the palpebral fissures, which are also oblique in position, and slope downwards and inwards. These two conditions of the eyes suggest the name Mongolian. Nystagmus and squinting are often present during the first six months, but pass away as the child grows. The mouth is small, and is usually kept open with the enlarged tongue protruding through it. This protrusion of the tongue is not constant, as in cretinism, as during sleep it is often kept within the mouth. The abdomen is large and distended, and umbilical hernia is common. The long bones are shorter and smaller than usual, the hands are square, and the thumbs and little fingers are short in proportion to the length of the other digits. The second phalanx of the little finger is shorter than normal, and there is much lateral displacement and lateral curvature of the digit. Owing to the looseness of the ligaments, there is great mobility of the joints, and the fingers can often be bent backwards to touch the arm. Congenital heart disease is often present, and occasionally other congenital defects, such as club-foot, imperforate anus, and cysts of kidney are found. The mental characteristics are not manifested by any special defect, save that the development of intelligence lags behind that of normal infants. They are generally described as good babies, giving less trouble and needing less attention than the average baby. The child will lie for hours smiling placidly and biting his fingers. This excess of goodness is not normal. The expression of the face is fatuous, and the power of fixing the eyes, observing objects, and all the signs of dawning intelligence, are slowly learned. They are capable of education, but are far behind normal children in this respect. As a rule they develop into affectionate imbeciles, never able to look after themselves or to earn their living. Their prospect of life is bad, as their vital powers are poor, their sensitiveness to cold extreme, their temperature subnormal, and they bear illness badly. They succumb to diarrhœa and pneumonia. The cause of the condition is probably to be found in some disease inherited from one or both parents, possibly syphilis, as fourteen out of twenty-five cases of the author's had a syphilitic history. In the treatment neither the employment of the thyroid nor the thymus gland were productive of any good result, nor did antisyphilitic treatment cause any change in the mental or physical characteristics. In the absence of any known cure, treatment must be general and symptomatic, and the onset of acute illness must be followed by special precautions, as these children succumb so readily to these affections.

REPORTS OF THE MEDICAL SOCIETIES.

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Edinburgh Medico-Chirurgical Society.—*June* 5, 1901.—Mr. A. G. **Miller**, President, in the chair.—Dr. R. **Purves** showed a case of musculo-spiral paralysis after operation. — Dr. **Mackenzie Johnston** showed a boy, æt. 4½, after removal of laryngeal papilloma, and the forceps employed.—Dr. **Norman Walker** showed—(1) A case of ringworm treated by X-rays; (2) four interesting cases of alopecia areata.—Dr. **Gulland** showed microscopic specimens of actinomycosis in pus.—Mr. **Caird** read a paper on "Resection of the Intestine for Tumours, Strictures, etc." The mortality in these operations is mainly due to sepsis from the gut divided during the operation. To avoid this risk, Mikulicz recommends that an incision be made over the tumour, and the mass drawn outside the wound and packed all round with iodoform gauze. It is left in this state for several days for adhesions to form, and then removed, the artificial anus being closed at a later date. Mr. Caird then described some recent cases of his—Tumours of the ileocæcal valve and ascending colon. Tumours in this region are more difficult to diagnose than tumours in any other part of the abdomen. They must be distinguished from chronic appendicitis, ectopic gestation, kidney tumours, and retroperitoneal sarcoma. Mr. Caird, when operating, used Kocher's angled forceps for clamping the gut, and stitched the gut end to end, using three guiding sutures. He had had six cases, with one death. All showed irregularity of the bowel, great distension above the tumours, and narrowing below: obstruction is rare, even when the lumen of the gut is very narrow. Of tumours in the sigmoid region he had had two primary cases, with one death: six secondary (for obstruction), with two deaths. The mortality is not high, but is avoidable. It is due—(1) to contamination of the cellular tissue posterior to the peritoneum; (2) to hæmorrhage from veins lacerated in separating the adhesions, these bleeding during the period of reaction after operation (one example of each in the ileo-cæcal cases). In the sigmoid cases the one death in the primary group was due to gangrene at the point of suture, with extravasation of fæces. In the secondary suture cases two deaths occurred, and in these cases obstruction had lasted for several days, and a preliminary colostomy produced no improvement, death probably resulting from septic absorption from the ulcerated surface of the tumour.—Dr. **Lewis C. Bruce** read a paper on "Clinical Experimental Observations upon General Paralysis of the Insane." General paralysis is incurable, but remissions, often lasting for a long time, frequently occur, and may give rise to the belief that the patient is cured. Syphilis is probably the only cause. From observing cases of the disease in progress, Dr. Bruce always finds gastric intestinal disturbances—vomiting, diarrhœa, gastric crises, etc. With regard to the temperature, in some there is no rise, in others a febrile attack from time to time. The most characteristic is a recurrent febrile attack every few weeks. In the second stage you have similar febrile attacks, and, as the patient gets exhausted, the temperature tends to get subnormal, rising occasionally to normal. In the third stage the temperature is irregular, each febrile attack is the reaction of the patient to an attack of a toxic substance. There is always a rise in the number of leucocytes with each rise of temperature, and the higher the rise the longer is the remission. It is hard to say when patient is in the remission stage, because of the slow progress of the disease. In undoubted cases the outstanding feature is the rise in leucocytosis before the remission sets in, and this gradually falls to normal as remission is established. These probably produce an antitoxine, which protects the patient for a time. Dr. Bruce was successful in producing remission in two progressive cases by injecting the defibrinated blood taken from a case in the remission stage. The *Bacillus coli* is probably one, at least, of the toxic organisms, and is absorbed from the intestine. Dr. Bruce suggested that cases might be treated by immunising a horse with injections of cultures of *B. coli*, and using serum.—Dr. FORD ROBERTSON read a paper on "New Observations bearing upon the Question of the Pathogenesis of General Paralysis of the Insane." The disease, he said, is essentially due to loss of durability of the nerve cells. Syphilis impresses those cells, so that they degenerate after a certain time. Locomotor ataxia is a similar condition in the spinal cord. Dr. Robertson thinks that general paralysis is due to a general toxæmia affecting the vessels generally, and not to an irritating substance resulting from breaking down of nerve tissue. The capillaries of the nervous system have a special adventitious coat, and toxines act on this, and so produce the vascular changes. These changes are most marked in those parts of the brain best supplied with blood; therefore the higher functions go first. Hæmorrhage from the stomach and intestine is due to the ulceration of tropho-neurotic origin. Of twelve cases observed all showed morbid changes in the alimentary tract, mainly thickening of the mucous membrane, with ulceration. These lesions are the effects of the same toxine, which induces changes in the vessels, etc., and not the cause. The poison is formed in the gastro-intestinal tract, and, owing to the weakened state of the inhibitory substances normally present, gets absorbed into the circulation, and there produces the vascular changes and resulting nerve changes.

EDINBURGH OBSTETRICAL SOCIETY.—*June* 12, 1901.—Dr. MILNE MURRAY in the chair.—SPECIMENS.—Dr. BERRY HART showed—(*a*) Fibroid tumour removed by pan-hysterectomy; (*b*) tubal abortion with drawing; (*c*) parovarian tumour with twisted pedicle; (*d*) ruptured ovarian cyst; (*e*) large papillomatous cyst.—Dr. R. C. BUIST (Dundee) showed uterus with deciduoma malignum after hydatid mole, with microscopic sections.—Dr. HAIG FERGUSON showed myomatous uterus, which presented unusual relationships, removed by abdominal hysterectomy.

Communications.—Dr. H. Oliphant Nicholson read a paper on "Eclampsia and the Thyroid Gland." He first considered the changes in the blood and the state and functions of the thyroid glands during pregnancy. He then related a case in which the usual pre-eclamptic symptoms were greatly ameliorated by the use of thyroid tabloids, and in which a living full-time child was born without any eclampsia whatever. During the patient's two previous labours she had had eclamptic convulsions. Dr. Nicholson discussed the relation of the thyroid gland to eclampsia, as seen in its bearing upon the different pre-eclamptic symptoms, such as œdema, albuminuria, high arterial tension, headache, and eye conditions. He held that defective action of the thyroid gland may and does produce these symptoms, culminating in eclampsia. He deduced evidence from—(*a*) the action of iodothyrin; (*b*) the diuretic effect of thyroid juice; (*c*) its antagonistic action to suprarenal extract; (*d*) its influence over urea production; (*e*) its effect upon the liver. In conclusion, Dr. Nicholson discussed the treatment of eclampsia and the pre-eclamptic state by thyroid extract.

OBITUARY.

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James Aitken Myrtle, M.D.

The premature death of such a public-spirited man is a great loss to the medical profession in Yorkshire. Born little over forty years ago at Harrogate, educated at Winchester, Edinburgh, Vienna, and Würzburg, he had for the last eighteen years been identified with his native town, where he settled down, in association with his father, after returning from his continental studies. Although Dr. Myrtle wrote several medical papers of real value, and along with his father edited a work on the Waters of Harrogate, he was better known in other fields than medical authorship. Professional ethics, municipal government, political duties, athletic pursuits, and sporting occupations engaged much of his activity, and in each and all of these walks of life he was a prominent figure. At the time of his death he filled the civic chair of his native town, and held a commission in the Yorkshire Yeomanry Hussars. Dr. Myrtle had been in his usual health, and his death, which occurred on 1st June, took place very suddenly. Much sympathy is felt for his father, who has been deprived of the filial assistance of a deservedly popular son.

ANALYTICAL REPORTS.

SOMATOSE, IRON SOMATOSE, AND LACTO-SOMATOSE.

(British Somatose Co. Ltd., London.)

WE have already, on more than one occasion, noticed the various Somatose preparations, prepared by Bayer in Elberfeld, Germany. The British Somatose Co. Ltd. now supply them in these islands. In the number of the *Edinburgh Medical Journal* for May 1898, the results of a careful chemical analysis of Somatose are given, and may be reproduced:—

SOMATOSE PER CENT.

Water	10·36
Total solids	89·64
Ash	7·56
Organic solids	82·08
Nitrogen	13·1
Albumose	81·8
Organic remainder	0·28

The albumose was found to be present almost entirely as the secondary variety, *i.e.* as deutero-albumose.

Somatose is a very fine light powder, exceedingly soluble in water, and that without stirring or mixing, nor does it give rise to any precipitate. All that is required is to sprinkle the amount of the preparation desired for use, on the surface of the menstruum in which it is to be taken, and allow it to stand for a few minutes, by which time a perfect solution will have occurred. Almost tasteless and odourless, and at the same time possessing a very high nutritive value, owing to the presence in it of over 80 per cent. of proteid in a greatly simplified form, great ease of absorption, because deutero-albumose is but little removed from peptone, and marked possibilities for rapid assimilation, it is no wonder that in many instances and in many hands success has followed its exhibition. It is certainly a powerful and important adjuvant in numerous cases of illness, where insufficient nutrition results from inefficient power to take, or deal with, grosser nourishment.

Iron Somatose is practically an identical preparation, save for an addition of 2 per cent. of iron, which is present in a mild organic form combined with the albumose. It often proves of great service in the treatment of gastric diseases associated with and aggravated by anæmia or chlorosis.

Lacto-Somatose is another preparation, similar to the two former, made from the casein of milk, and therefore containing deutero-caseinose in place of what is most probably largely deutero-myosinose; partly albumoses from various native proteids. To the powder, as prepared from milk, 5 per cent. of tannic acid is added, rendering it slightly astringent, and therefore more suited for children and infants, a fact the more important when one considers that a free ingestion of the first two forms is liable to occasion some diarrhœa, even in adults.

The dose is the same in each, *i.e.* a teaspoonful thrice daily for adults; half or two-thirds of this for children. But smaller quantities more frequently given seem to us to be followed with better results in most cases, especially as three regular meals are not often indulged in, or, if they be taken, usually cause disquietude and distaste for more in invalids and dyspeptics.

Made use of sensibly upon proper occasions, in digestive defects, fevers, convalescence, etc., they prove most beneficial.

PLASMON.

(The Plasmon Syndicate Limited, London.)

PLASMON is a tasteless, white, dry powder without odour, derived from the casein of milk. Entirely soluble in water, it imparts to its solution a slight opalescence. When this solution is boiled, a skin of coagulated albumen forms on its surface, similar to the skin found on boiling fresh milk. Plasmon is really the precipitate of casein which forms when carbonic acid is passed through milk, allowed to settle, separated, and dried in an atmosphere of the same gas.

Analysis of Plasmon yields the following values per cent:—

Water	10·65
Total solids	89·35
Ash	7·21
Organic solids	82·14
Milk fats	0·81
Proteids	81·33

The most important fact regarding Plasmon is that the proteids contained in it, by virtue of the special method of preparation, remain unaltered, unchanged from the chemical condition presented by them in fresh milk. Dr. C. Virchow, experimenting upon himself, concluded that Plasmon was extremely digestible and highly nourishing.

Dr. Virchow sums up the results of his investigation thus:—"(1) Plasmon contains no toxic or drastic substances, such as are sometimes met with in peptone preparations. (2) It causes no disturbance of the digestive organs, except perhaps if excessive quantities are taken certain symptoms of stoppage may be met with. (3) Even when large quantities are quickly taken, no oppressive feeling is produced. (4) The continuance of the diet does not give rise to repugnance, which is clear from the fact that I experienced no desire for meat or other animal food whilst on Plasmon diet. (5) A pleasant feeling of sufficiency is remarked, and even when working very hard and with a minimum of sleep, neither the capacity for work nor the weight of the body is diminished."

In fact it is, as several other artificial proteid products are, a useful adjuvant to ordinary diet, or in larger quantity a substitute for part of the common articles of food; but, on the other hand, it apparently possesses a great advantage in that it causes no gastro-intestinal inflammation, indeed rather the other way, and that the proteids contained in it are almost completely digestible and assimilable.

Plasmon is also supplied in the form of Plasmon cocoa and Plasmon chocolate. The chocolate contains 25 per cent. of plasmon, or 20·25 per cent. milk proteid. Adding the nutritive and heat values of the chocolate (75 per cent.) to those of the plasmon (25 per cent.), a very high return is yielded. Chocolate itself is relatively very sustaining. Plasmon chocolate is immensely more so, while it is very pleasant to the taste. The cocoa is perhaps not so agreeable to the cocoa-drinker as the chocolate is to the ordinary person; it lacks the "body" found in the finest cocoas in the market; but then it should be regarded in great part as a medicinal agent, and about its increased nutritive value there can be no doubt. As it has been freed from almost all of the cocoa butter, and has had plasmon added to it, when prepared in the ordinary way it is not so full of flavour as other cocoas. This drawback is more than neutralised by its increased metabolic possibilities.

Plasmon, in truth, is a close approximation to the ideal chemical diet which enthusiasts prophesy will be the only food of mankind some æons hence; but still is scarcely adequate to support life in itself, although a most promising therapeutic agent in the treatment of digestive disorders and in the metabolic stimulation of feeble assimilators.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING MAY 25, 1901; AND FOR THE YEAR FROM JANUARY 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees.		Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
		Above 42°.	Below 42°.					
Mean	47°·75	[1] 201° [2] 468°	29° 606°	1·9	11·1	158	503	2°·7
Observed	49°·0	[1] 236° [2] 437°	27° 654°	1·2	9·6	211	547	2°·8
Difference	+1°·25	[1] +35° [2] −31°	− 2° +48°	−0·7	−1·5	+53	+44	+0°·1

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH, DUNDEE, ABERDEEN, AND LEITH), DURING MAY, AND SINCE JANUARY 1, 1901. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1] 1149 [2] 6148	193·8 207·4	256 1192	43·15 40·07	110 585	18·6 19·7	197 1311	33·2 44·1	139 693	23·4 23·3
Actual Deaths and Rate per 10,000	[1] 1226 [2] 6231	206·8 210·2	271 1255	45·6 42·2	112 605	18·9 20·3	198 1153	33·3 38·8	132 703	22·2 23·6
Difference from Mean	[1] + 77 [2] + 83	+13·0 + 2·8	+15 +63	+2·45 +2·13	+ 2 +20	+0·3 +0·6	+ 1 −158	+0·1 − 5·3	− 7 +10	−1·2 +0·3

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1] 69 [2] 357	11·6 12·0	28 152	4·8 5·1	86 500	14·5 16·8	125 605	21·0 20·3	56 257	9·5 8·6
Actual Deaths and Rate per 10,000	[1] 90 [2] 409	15·1 13·7	34 173	5·8 5·8	108 510	18·2 17·1	112 555	18·9 18·6	56 299	9·5 10·0
Difference from Mean	[1] +21 [2] +52	+3·5 +1·7	+ 6 +21	+1·0 +0·7	+22 +10	+3·7 +0·3	−13 −50	−2·1 −1·7	± 0 +42	± 0 +1·4

* NOTE.—The figures [1] denotes the data for May, [2] for year to date.

The values of the vital statistical returns for last May are given in terms of the estimated population of the Scottish cities to the middle of 1901, based upon the returns of the recent census. In 1891 the inhabitants of the four cities, here included, numbered 623,834; in 1901, 708,894; an increment of 75,060, or 12 per cent. The calculated number to the middle of this year, founded upon the earlier census, fell 5745 below that now shown by the latter, or 0·81 per cent. The altered figures for the population necessarily render the rates slightly lower. The values accumulated from the commencement of the year are expressed in relation to the new totals; the data for the first four months being converted in correspondence with them.

The weather of May, up to the 25th, was fine, warm, dry, and exceptionally sunny. The mean temperature 1°·25 above the average, an excess of 35° of warmth over 42° F. in day degrees, or 17·4 per cent. of the normal; a deficit of 36·8 per cent. in the rainfall; an increase equal to 33·5 per cent., in number of hours of bright sunshine. During the second fortnight of the period, in place of the normal eighty-two hours of sunshine, 136 were recorded, an increase of nearly 66 per cent.

For the year to date the undue preponderance of cold still maintains, but in less degree; the rainfall declines to 13 per cent. under normal; hours of sunshine to nearly 9 per cent. over it. For the second month in succession, characterised by fine weather, the deaths are more numerous than expected, but in May not nearly so markedly as in April. Digestive, pneumonic, urinary, and constitutional diseases, chiefly participate in causing this increase, while nervous causes and phthisis show decreases. Influenza caused ten deaths.

The values for the year present no variation of importance from those noted at the end of April.

EDINBURGH MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

SOME NOTES ON ALCOHOL IN ITS MEDICAL AND SCIENTIFIC ASPECTS.[1]

By G. Sims Woodhead, M.A., M.D., *Professor of Pathology in the University of Cambridge.*

When I was asked by your President to take part in this discussion, I gladly assented—(1) because, as many of you know, I take considerable interest in the question of Alcoholism; (2) because I know that your President is equally interested; and (3) because I expect to profit from the valuable contributions to the question to be made to-night, so valuable indeed that I may look upon my task as a comparatively light one.

Knowing, as many of you do, that I take what some may consider to be an extreme attitude in this question, and realising that a man is much more easily made to appear convicted of error out of his own mouth when tackled by abler men than himself—although he may be thoroughly in the right—I shall, in dealing with the pathological conditions produced by alcohol, ask you to take much of what I have to say as put in the form of suggestion and question, although I may put my statements forward in somewhat dogmatic form. Many of you have looked at the question from quite other standpoints than that from which it has been my lot to survey it; and although we all who take part in this discussion may be able to answer most of the questions raised to-night to our own satisfaction, the cases of "conviction" may be somewhat isolated. Nevertheless the question is one that may be ventilated with great advantage, especially as it is one concerning which such wide differences of opinion exist. It is always well to have clear issues, and before we can discuss this matter reasonably we must arrive at some agreement as to the category under which alcohol must come. Is it a poison? Is it a drug? Is it a food? Or, if it is all three, as some maintain, in which category does it play the most important rôle? As a food, or even as a drug, does it play a part anything like so prominent as it does as a poison?

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[1] Introductory to a discussion at a meeting of the Edinburgh Medico-Chirurgical Society, July 1901.

We shall all agree, whether we take it or not, that it is a narcotic poison, and certainly that, as a pathogenetic agent, it is a protoplasmic poison. To this side of the question we must return. Is alcohol a drug? Certainly it is, but it is not a panacea for every ill to which flesh is heir, rivalling and even outstripping in the universality of its application the many "specifics" of the great army of quacks. If this be accepted, let us keep alcohol in its proper position as a drug, and let us use it and prescribe it as we should use any other medicament, not loosely, but with a definite end in view, and at any rate with some show of scientific precision. This, however, is beyond the scope of what I have to say, though I hope that the question will be raised by some of those who take part in this discussion.

The third question, Is alcohol a food? interests us greatly, because it appears to me that it is when alcohol comes to be looked upon as a food, and not as a potent drug, or a somewhat dangerous beverage, that it becomes responsible for the greater part of the diseases that are now ascribed to its action. Few physiologists nowadays deny that alcohol is oxidised in the body, and to that extent may supply a certain amount of heat, but that any sane man would put forward alcohol as able to supply the number of calories required by the body, and easily given by carbohydrates and fats, is now scarcely conceivable. The calculation has been made that such an amount of alcohol would be a constantly recurring certainly fatal dose.

Quite recently Dr. John Madden,[1] criticising Professor Atwater's experiments,[2] and the resultant teaching on the food value of alcohol, points out that alcohol differs from fats and carbohydrates, in so far that it is a violent protoplasmic poison, whilst they exert absolutely no toxic effect. In another direction, Ehrlich's[3] teaching on nutrition has a most important bearing on this question. The nutrition of cell protoplasm appears to result from a combination of certain proteid elements with the cells; for this combination certain bonds or links, or side chains as he calls them, must be present; in their absence there can be no application of these nutritive substances to the use and nutrition of the cell. All these links appear to be connected with the nitrogenous element, and consequently, unless this nitrogenous element be present, the nutritive combination cannot be effected. Alcohol does not contain this nitrogenous element. It certainly enters into combination with the protoplasm, but apparently in quite a different fashion from the nutrient substances ordinarily utilised by the cell, acting as a purely toxic agent and not as a nutrient substance. It interferes with the ordinary processes of metabolism, and to that extent is deleterious.

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[1] *Am. Med.*, Phil., 1891, vol. i. pp. 209 and 258.

[2] *Harper's Mag.*, No. 605, p. 684.

[3] *Proc. Roy. Soc. London*, 1900, vol. lxvi. p. 424.

It is sometimes said that alcohol, like the fats and carbohydrates, even though it does not act directly as a nutrient material, may act as a respiratory food, and that it may, like these substances, be converted into a reserve supply of fat, upon which the organism may call whenever extra expenditure of energy is required.

Madden points out that there is absolutely no evidence of this, but that there is evidence, as pointed out by Weiske and Flechsig,[1] and Miura,[2] and Schmidt,[3] that, in place of protecting the nitrogenous tissues from undue waste, as do the carbohydrates and fats, alcohol actually hastens their waste, appearing to do this through its action as a protoplasmic poison, this being marked, however, only in patients or subjects who are not accustomed to the use of alcohol even in small doses.

One most important feature in connection with alcohol as a nutrient material and as a producer of disease, is the extraordinary avidity that it, like phosphorus, appears to have for oxygen; this it is that probably renders these substances prime factors in the determination of certain forms of fatty degeneration; it may also explain the wasting that takes place in the nitrogenous tissues of certain patients in whom there appears to be an abundant store of fat accumulated in the subcutaneous and other connective tissues. Under ordinary circumstances, the fat and carbohydrates taken into the body, or used up after being taken into the body, are readily oxidised by the respiratory oxygen, *i.e.* by the oxygen brought from the lungs by the hæmoglobin of the red blood corpuscles; they use up, in fact, the oxygen that is most readily obtained, and when the supply is exhausted then oxidation apparently no longer goes on. In the case of alcohol, however, we have a much more active process; it becomes oxidised, under conditions in which oxidation of fat and the carbohydrates could not take place; and, like phosphorus, in virtue of this property, it appears to divert to its own use oxygen, which, under normal conditions, would go to protect the nitrogenous tissues from undue waste.

In Madden's words, it "makes the demand for oxygen so great that it cannot be supplied by the normal process of respiration. Oxygen to supply this demand is therefore abstracted from the tissues, causing a derangement in their functions and metabolism." It interferes with the normal oxidation of carbohydrates and fat, and to that extent sets up abnormal metabolic processes, which end in the destruction of protoplasm and in the accumulation of the resulting fatty degenerative products in the protoplasm. Such fatty degeneration is perhaps seen best in the heart muscle, but what takes place in the heart may also take place in the muscular wall of the blood vessels of the intestine and of the other muscles and organs of the body. In all these cases, owing to the impairment of the nutrition of the protoplasm, and to the imperfect oxidation that takes place therein, the secondary fibrous and calcareous changes, so frequently associated with premature senility, are, I believe, directly due to this peculiar action of alcohol. The very readiness with which alcohol becomes oxidised, and with which the large amount of latent energy which it contains is set free in the body, renders its use dangerous, as these are the very features that characterise many of the products of the micro-organisms that induce disease. In this respect they all resemble phosphorus, and all of them offer us evidence of the danger of assuming that, because it is readily oxidised in the tissues, it is to be looked upon as a substance useful in the animal economy.

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[1] *Jahresb. ü. d. Leistung. d. ges. Med.*, 1889, Bd. ii. S. 486.

[2] Quoted by Madden, *loc. cit.*

[3] "Inaug. Diss.," Greifswald, 1898.

Ehrlich has pointed out that substances that conform much more closely to ordinary nutritive substances than do alcohol and phosphorus—the proteid toxines—are capable of combining with and acting as nutrient substances for protoplasmic cells, and that this renders their use dangerous. They combine with the cells as do ordinary nutrient substances, but they have a secondary action, which interferes enormously with the normal metabolic processes of the cell and the degeneration of the cell results. In the case of alcohol we appear to have this degenerative action, without any accompanying nutrient action or nutrient combination.

It is because of this want of the nutrient element that the protoplasmic cells do not in time become accustomed to the poisonous action of alcohol as they may to the poisonous action of the proteid toxines. As a result of tissue reaction between the toxine and the cell, the tissues of the body, as a whole, may in time become capable of withstanding enormous doses, thousands of times the original lethal dose of certain proteid toxines; but in the case of alcohol the process of immunisation, however careful and prolonged be the treatment, is only slightly—and then only apparently—increased; the degenerations, occurring as the result of the prolonged use of alcohol, affording marked evidence that the tissues at any rate do not become immune to its action in any very high degree.

It is important to bear in mind that alcohol acts as a cumulative poison, not only as to alcohol itself, but also in connection with the waste products of the body, and with certain other poisons of which arsenic, antimony, and phosphorus may be taken as types. There is still no great weight of evidence as to the experimental production of combined arsenical and alcohol poisoning; but, from the facts that have been adduced in connection with the recent epidemic of poisoning by arsenicated beer, it is evident that peripheral neuritis, resulting from the action of the combined poisons, is much more marked than when these poisons are allowed to act separately; there is, in fact, a cumulative action, the tissues "weakened" by one poison being more readily affected by the other. We shall probably have further light thrown on this subject when the full account of the recent epidemic appears, but it is interesting to note that what has been suggested in connection with this set of poisons—arsenic and alcohol—has been proved in connection with others, in connection with which experiments could be directly made.

For some time past it has been recognised by those who were observing the action of alcohol most closely, that it was in some way acting as a predisposing cause to specific infective diseases. M'Leod and Milles of Shanghai, in their admirable study of cholera,[1] insist most strenuously upon the importance of this factor in rendering patients susceptible to this disease. Later, in 1896, Abbott[2] pointed out that the normal resistance of rabbits to infection by *Streptococcus pyogenes erysipelatis* is markedly (and by *Bacillus coli communis* in a lesser degree) diminished by the use of alcohol, when given daily, to the stage of acute intoxication, and added that "the results of inoculation of alcoholised rabbits with the erysipelas coccus correspond in a way with clinical observations on human beings addicted to the excessive use of alcohol when infected by this organism."

Not only did alcoholised animals show the effects of inoculation considerably earlier than did the non-alcoholised rabbits, "but, in the case of the streptococcus inoculations, the miliary abscesses produced were much more pronounced than were those that usually follow the inoculation of this organism." He adds that the diminished resistance here noted may be the result of structural alterations, consequent upon the direct action of the streptococcus on the tissues, as such alterations have now frequently been noticed.

It may be, however, that "the conspicuous influence of alcohol on the gastric mucous membrane" is the explanation of the marked loss in body weight, and that "the susceptibility induced by alcohol to excess is somewhat analogous to that induced by starvation, in which there is now ample proof that the resistance of animals to particular forms of infection is very markedly diminished."

These animal experiments were of considerable interest, and it was evident that they must be repeated by other observers, and under similar and different conditions. The following year, Delearde, in Professor Calmette's laboratory in Lille,[3] carried on a series of experiments to determine whether in animals poisoned by alcohol the different virus and toxines can, as under normal conditions, confer immunity. He found that animals treated with considerable doses of alcohol were less resistant to the action of the anthrax bacillus, tetanus toxine, and rabies poison; and also that it is a more difficult matter to render and maintain such animals immune to the action of these poisons than it is in the case of non-alcoholised animals. Not only is it the case during the time that the alcohol is being given, but in many instances the effects of the drug appear to continue for some time.

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[1] *Rep. Lab. Roy. Coll. Phys. Edinburgh*, 1889, vol. i. p. 161.
[2] *Journ. Exper. Med.*, N.Y., 1896, vol. i. p. 458.
[3] *Ann. de l'Inst. Pasteur*, Paris, 1897, tome xi. p. 837.

It is interesting to observe that Dr. Delearde's attention was first directed to this matter, by the observation that an alcoholic patient, bitten by a rabid dog, appeared to be much more susceptible to the action of the rabies poison than another patient bitten and inoculated under otherwise much less favourable conditions.

All these experiments, however, had been carried on with animals treated with large and acutely toxic doses of alcohol, and were open to the objection that none but advanced alcoholics and actual drunkards are open to the susceptibility set up and maintained by the exhibition of large doses of alcohol.

Some two years ago, when visiting Professor C. Fränkel in the Pathological Laboratory at Halle, I was introduced to Dr. Laitinen of Helsingfors, who, Fränkel said, was working at a subject in which he knew I was interested. These experiments have since been published,[1] and are well worthy of most careful perusal by those who wish to study this subject.

He took as the basis for his "small dose" experiments the amount of alcohol given as a nutrient substance or as a medicine, or both, in a sanatorium at Davos, *i.e.* 40 to 60 c.c. of pure alcohol, or 0·5 to 0·8 c.c. per kilo., taking care to keep well within these quantities, and to use the alcohol in sufficiently diluted form. Sometimes the alcohol was given over periods of weeks or months before the inoculation or infection of the animal was commenced, and was continued after the infection; sometimes doses large enough to produce acute poisoning were given.

He used for his infecting material—(1) anthrax bacilli, Pasteur's "first vaccine," for susceptible animals (rabbits), whilst for the more resistant animals (dogs, fowls, and pigeons), a highly virulent culture was used; (2) tubercle bacilli in a glycerin emulsion, diluted with normal saline solution to 1:1000 and 1:10,000, 10 c.c., of one of these dilutions being injected into a vein; and (3) diphtheria toxine, of which the lethal dose can be easily measured. His first conclusion, as the result of nearly forty sets of most careful experiments, is that alcohol, however given, induces in the animal body a markedly increased susceptibility to artificial infection or poisoning, by the above infective and toxic agents; and he maintains that his experiments indicate that the use of alcohol in the treatment of anthrax, tuberculosis, and diphtheria, at any rate, is not only useless but is probably actually deleterious. From a number of other experiments carried out with the greatest care, he comes to the same conclusion as do Abbott, Welch, and others—that the predisposing action of alcohol must be looked for in the production of abnormal conditions, as pathological changes in the various organs—alimentary canal, liver, kidneys, heart, nervous system, etc.

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[1] *Acta Soc. Sc. Fennicæ*, Helsingfors, 1900, vol. xxix. No. 7.

On the blood itself, alcohol appears to exert some direct effect, its alkalinity being slightly diminished and some leucopenia induced, during which latter there appears to be a slight decrease in the bactericidal power of the blood, and an increased susceptibility of the tissues to the action of infective agents.

Going beyond the general question of infection, and simply to bring forward evidence of the deleterious action of alcohol on the nutrition of the tissues, he points out that his experiments prove that pregnant animals and their offspring are markedly affected by the continued use of small doses of alcohol. The normal temperature and that in disease are, especially when large doses of alcohol are used, temporarily but often only very slightly lowered; but it appears that it is during this temporary lowering of the body temperature that we have the most favourable condition for the invasion of infective agents. As Pembrey[1] has pointed out, the fall in temperature is due to increased vascularity of the skin and increased activity of the sweat glands, the normal reaction to cold being paralysed by large doses of alcohol. Although he agrees with Laitinen, that alcohol taken in small quantities causes only slight depression—less than half a degree—the specific action is seen much more markedly when considerable doses are given, the lowest temperatures recorded having been observed in drunken persons, whilst animals exposed to cold have their temperature depressed to an enormously greater degree when they are alcoholised than when they are not so treated. For example, the temperature of a normal rabbit exposed to cold only falls about 2°·8 C., whilst the temperature of an alcoholised rabbit may fall 19° C. In the same way the fall of temperature of a normal guinea-pig exposed to cold is only from 0°·1 to 0°·2, whilst the fall in temperature of an alcoholised guinea-pig, similarly exposed, may be as much as 10°. These facts are of considerable importance in connection with conditions of susceptibility. Pasteur found, for example, that by lowering the temperature of a hen he could render it much more susceptible to anthrax infection, and other observations of an analogous character have been made. This and other points are worked up fully by Dr. Laitinen, but this short sketch will suffice to indicate the scope of his work and the results he obtains.

Let us consider the relation of alcohol to phthisis alone. We have direct evidence that alcohol even in small doses predisposes to infection by the bacillary virus of this disease; and if this be true as regards primary infection, can it be any less true in regard to secondary and continued infection? The extension of the tuberculous process is merely an infection and invasion of other and surrounding tissues, an infection that we are constantly trying to cut short or prevent; and if alcohol increases the susceptibility of the tissues of animals to this infection, or interferes with a production of immunity which we are constantly trying to induce, it can scarcely be good as a permanent medicament or alimentary substance for human subjects suffering from this disease. Beyond this, however, there is another factor which should never be lost sight of. Alcohol, as we have so often been told, "insists" on being oxidised when it once gets into the body, and in phthisis pulmonalis, where there is such marked interference with the respiratory processes, and where in consequence there may already be an interference with the oxidation of the carbohydrates and fats, this may be a most serious factor in bringing about an accumulation of fat in the liver, and in setting up fatty degeneration in the cells of this and other important organs. I shall not attempt to describe the pathological changes set up by alcohol, but I should like to point out that fatty and fibrous changes are not confined to the liver in alcoholics, although they are most frequently associated with that organ. In this connection it must be remembered that one of the difficulties encountered in any attempt made to determine the pathogenetic action of alcohol is the very wide general toxic effect it exerts on the system. For instance, Mitchell Bruce[1] calls attention to the fact that the direct effects of alcohol on the heart and vessels are so "complicated with the many indirect effects which it produces on these organs, by deranging the functions of alimentation and assimilation, the nervous system and the kidneys, and with the secondary effects on the vessels and heart of chronic nephritis, due to the same cause, that it is difficult to determine which are direct and which are indirect." He is satisfied that dilatations of the heart and alterations in the myocardium are often met with as the direct result of alcoholism—acute dilatation, fatty degeneration of the myocardium being of frequent occurrence amongst alcoholic patients. In the post-mortem room my observations led me to very much the same conclusions: that there are two sets of conditions which appear to be the direct result of the use of alcohol. I have seen two cases,—both in young, otherwise healthy people, who had succumbed to acute alcoholism,—a condition of acute myocarditis without any endo- or pericarditis, in which there was cloudy swelling of the muscular fibres in a marked degree, in one this being accompanied by a peculiar hyaline condition of some of the fibres. In both there was marked interstitial change, resulting in the accumulation of numerous cells —leucocytes and proliferating fixed connective tissue cells— between the muscle fibres.

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[1] Schäfer's "Text-Book of Physiology," 1900, vol. ii. p. 53.

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[1] "Lettsomian Lectures on Disease and Disorders of the Heart and Arteries in Middle and Advanced Life," *Lancet*, London, 1901, vol. i. p. 845.

In the more chronic alcoholic cases, so frequently met with, fatty degeneration of the heart muscle, sometimes of a most marked type, is usually found; but, in addition to this, an increase of fibrous tissue between the bundles of muscle fibres, and in certain cases distinct evidence of muscular atrophy, may be recognised. It is in young alcoholics, and especially in those who have been otherwise healthy, that the study of these changes in the heart should be carried out; as in later life the changes in the blood vessels associated with Bright's disease, with cirrhosis of the liver and changes in the nervous system, conditions of malnutrition, many of them the direct result of alcoholic poisoning not always directly traceable to this condition, make their appearance.

But the heart appears to be affected by alcohol long before any organic change can be made out in its tissues. For proof of this we must refer to the physiologist, who tells us that alcohol renders systolic output incomplete,[1] increases the diastolic pressure and the dilatation of the heart. He quotes Stephen Hales, who says: "The heart being in this case like a water mill that is surcharged with a flood both before and behind its force, must needs abate and grow languid." In this condition, experimentally produced on animals by the exhibition of alcohol, the heart may become so large that it can no longer beat in the confined fibrous pericardium, and finally cessation in diastole takes place; alcohol certainly lowers the arterial tension.

Perhaps the best tissue in which to study the direct action of alcohol on protoplasm is the nerve cell. It appears that alcohol is only one of a large group of substances which exert a definite and appreciable action upon these cells—acetate of lead, arsenic, bromine, antipyrine, cocaine, strychnine, toxines of rabies, tetanus, etc.[2]

Heinrich Dehio[3] carried out a series of experiments on the influence of acute alcohol poisoning on nerve cells. These were subsequently repeated by Colin C. Stewart,[4] who, injecting alcohol subcutaneously into cats in quantities sufficient to produce acute alcoholism, found that Nissl's granules gradually disappeared (the protoplasmic basis becoming slightly stained) from the nerve cells of the cerebral cortex, from Purkinje's cells, and from the multipolar cells of the spinal cord, all this indicating a marked toxic condition, such as is met with in connection with diphtheria, tetanus, and other poisonings, the changes being more marked as the dose of alcohol is increased, and as it is allowed to act for a longer period.

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[1] Leonard Hill, Schäfer's "Text-Book of Physiology," 1900, vol. ii. p. 53.

[2] Schäfer, *op. cit.*, vol. ii. p. 604.

[3] *Centralbl. f. Nervenh. u. Psychiat.*, Coblenz u. Leipzig, 1895, N. F., Bd. vi. S. 113.

[4] *Journ. Exper. Med.*, N.Y., 1896, vol. i. p. 623.

That such pathological changes could be demonstrated as the result of acute alcohol poisoning, has only recently been made out, though every physician who has had cases of alcoholic poisoning under his charge could not but be convinced of the presence of some serious nerve changes in this condition. In regard to chronic alcohol poisoning, the conviction that alcohol acts detrimentally on the nerve cells and their surroundings and continuations, has not been nearly so widespread amongst medical men generally; but amongst pathologists, and especially amongst those working in our asylums, the number and variety of lesions met with as the outcome of this form of poisoning has been recognised and studied for some time past. Berkeley[1] quotes Bevan Lewis, one of our earliest, best, and most accurate observers, who says: "In alcoholic brains the cells become granular and show a shrunken protoplasm-stunted processes," which changes he maintains are "the after-effects of long-continued malnutrition and irritation of the cells by the poison." Following up these observations, Berkeley himself demonstrated serious pathological changes in the nerve cells and their processes as the result of chronic alcohol poisoning. He found that in the cortical cells of the cerebrum changes occur in the nuclei and nucleoli, the former becoming irregular in outline, the latter becoming enlarged. Both these changes are met with when the cells are over-stimulated, or when they are badly nourished, and especially when there can be demonstrated any accumulation of waste products in the protoplasm of the cell, or in the lymph spaces of Obersteiner. Under the same conditions, marked changes take place, as we have seen, in the protoplasm of the body of the cell; but, in addition to these, the special processes of the pyramidal cells, and the special dendrites, also undergo alteration, assuming a peculiar moniliform appearance. All these changes are described by Berkeley, and figured with great clearness; and moreover, he has been able to correlate symptoms and nerve lesions in a most instructive fashion, and to associate the lesions with causes which may be grouped under the heading of overwork and fatigue. He points out that in vascular disorders of the brain, induced by the use of alcohol, the nerve cells are irritated by the presence of a poisonous stimulus and an insufficient supply of proper nourishment; they overact for the time; and then, as nutriment is still withheld from them, altered metabolism results. He, like Bevan Lewis, maintains that the beginning swellings of the dendrites of the sensory motor region is accompanied by "anæsthetic and paræsthetic symptoms, those of the purer and sensory regions by visual and ocular troubles and some amnesia, especially for recent events; or, in other words, cells that have the function of evolving thought cannot work properly, and defective memory results. Later, as the motor cells become more and more involved, and nuclear changes begin, continuous tremor becomes apparent, the muscles no longer co-ordinate perfectly, unless for a moment, under the direct influence of the will; still later, when a portion of the cell structures becomes highly degenerated, and the altered cells have become more numerous, the already tottering will power becomes less and less active, judgment and memory fail, and when the degenerative process has far advanced, an incomplete dementia is the final result."

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[1] *Brain*, London, 1895, vol. xviii. p. 475.

Here is no speculation; the observers noted the symptoms in the alcoholic patients, followed the cases carefully during life, and examined them equally thoroughly and carefully after death. The conditions then found may be compared with those met with in healthy brains, in brains of animals over-stimulated and exhausted, and with brains from patients suffering from the results of other diseases and poisonings. Moreover, Berkeley[1] points out that the lesions produced by him in the rabbit may be met with in the human brain,—the same degenerative process, "varying only in degree; in some intense, in others less so." "Such lesions of the neuron are not," he again writes, "peculiar to the effect of alcohol, but may be reproduced by any irritant drug or bacterial toxic product circulating in the blood, and acting for a considerable time on the living protoplasm of the nerve cell"; and, finally, "alcohol which was supposed to be the least deleterious of all the series, exerts a very definite and destructive effect upon the nerve cell." Other observers corroborate these appearances in a most remarkable fashion. Vas[2] says that alcohol, acting on the great cells of the anterior horn of the spinal cord and spinal sympathetic ganglion, brings about a loss of their chromatin structure; the finely granular character is perceptibly diminished, and there is homogeneous swelling; the protoplasm becoming more darkly stained than in the normal cells; and Andriezen[3] describes the extensive changes in the neuro-dendrites and the neuraxons of the nerve cells of the cortex, the alteration beginning in the fine bead-like contact granules upon the substance of the protoplasmic extensions; then moniliform swellings are seen "along the course of the terminal protoplasmic twigs." "With the further progress of the lesion, these softened and enlarged protoplasmic masses form irregular botryoidal masses, mainly clothing the now irregularly bared protoplasmic stem, which rapidly becomes attenuated." The changes in the cell body are of a similar nature, and consist in a gradual disintegration of the cell after the apical and other of the processes have become affected. Here and there, at the side of the cell body, the protoplasm seems to become frayed or, as it were, eroded. In other cases the cell protoplasm becomes vacuolated from within, and the process continues until the whole interior protoplasmic structure is channelled by holes and seams of liquefaction. In the descriptions and demonstrations given by these three observers alone, we have materials on which to found a study of the pathological changes set up by alcohol. The conditions under which these changes are produced are now more fully understood; they may in certain measure also be controlled, and we are thus in a much more satisfactory position or coign of vantage from which to study the direct changes that take place in these and other tissues; and we may ere long obtain still more definite information on many of the points around which such keen controversy is now carried on.

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[1] *Loc. cit.*, p. 295.

[2] *Arch. f. exper. Path. u. Pharmakol.*, Leipzig, Bd. xxxiii. S. 141.

[3] *Brain*, London, 1894, vol. xvii. p. 669.

Leaving the nerve cells, and turning our attention to the nerve fibres, we find that the physiologists have attacked the problem of the effect of alcohol on the functioning of nerves. Gotch[1] indicates that alcohol, amongst other chemical anæsthetics, can diminish the functional attributes of living nerve fibres without causing permanent impairment, and can exert this effect when reaching the tissues through the blood. At first there appears to be a slight increase in the local excitability of the nerve, and, in a less degree, of conductivity. Very soon, however, in place of this excitation, the conductivity of the nerve becomes impaired, and this goes on rapidly before the local excitability becomes diminished. When the exhibition of the alcohol is discontinued, the normal conductivity is gradually and very slowly reinstated, but the excitability returns much more rapidly. It is evident that if this anæsthetic action be repeated for a few times only, no permanent change is induced, even in the functioning of the nerve; but from what has been observed of the clinical history of, and pathological lesions met with, in certain cases of peripheral neuritis, we should be quite prepared to find that even here the jar may go to the well once too often. In connection with this let me quote what Professor Schäfer says concerning alcohol and metabolism[2]: "It cannot, in fact, be doubted that any small production of energy resulting from its (alcohol) oxidation is more than counterbalanced by its deleterious influence as a drug upon the tissue elements and especially upon those of the nervous system."

May I be allowed to sum up my own opinion of alcohol in a few words. It is a narcotic poison, of which the pernicious effects are to be seen at all times and on every hand. It is a drug which, under certain conditions, *may* be valuable, but it is a dangerous medicament in the hands of any one but a physician; and even in the hands of the physician or surgeon, its exhibition is attended with dangers that attach to the prescription of no other substance in the pharmacopœia; these dangers are not moral only, but physical dangers, resulting from the action of alcohol on the tissues generally, but especially on those of the nerve centres. Its food *value* under ordinary conditions is practically nil, and, put in the most advantageous light, can only be temporary, and then of an extraordinarily slight and, I believe, wasteful character.

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[1] Schäfer's "Text-Book of Physiology," vol. ii. p. 492.

[2] *Ibid.*, vol. i. p. 882.

INDICATIONS FOR SURGICAL INTERFERENCE IN APPENDICITIS.[1]

By WALTER G. SPENCER, *Surgeon to the Westminster Hospital.*

IN spite of all that has been written of late, the treatment of appendicitis is a subject in which there is much active interest; and this is especially so with respect to the particular features presented clinically in the early stage by individual cases. All desire that we may be able to separate those amenable to medical treatment from those which can be only benefited by surgical measures, and further to recognise among the medical cases those which will probably or certainly recur, and, among the surgical patients, to distinguish those on whom an operation should be performed at once, instead of being put off to a safer time. For, whilst it is certain that a great number of patients must be treated surgically, in order to escape a dangerous or fatal disease, recurring attacks and chronic ill health, yet it will be unfortunate, and tend to a loss of confidence in surgery on the part of patients, physicians, and general practitioners, if the impression becomes more wide-spread, that surgeons are inclined to look upon every case of disturbance in the region of the cæcum as one for surgical treatment sooner or later.

A CLINICAL CLASSIFICATION.—It is my aim to bring under notice the chief points which should enable us to individualise cases, so that we may with all due deliberation—yet always with readiness to change our view should the course of the case alter—be able, at the earliest possible moment of the illness, to decide on the treatment applicable to the particular case. For this purpose, we cannot use classifications adopted in systematic descriptions. One based on pathological anatomy is out of the question, from a clinical standpoint. Clinical histories of cases and their pathological anatomy are not yet in accord, and we cannot assure ourselves beforehand of the naked eye or microscopical changes which the appendix may have undergone. Nor can we base our classification on the complete course of the case, *e.g.* whether mild or severe, local or generalised, since such a grouping can only be made on the completion of the case, and neither an acute nor a mild onset is related to the indications for medical or surgical treatment. The statistics of appendicitis hitherto published are not helpful, not only because statistics do not apply to individuals, but also the statistics are as yet incomplete. Hospital statistics of appendicitis represent the severer cases drawn from variable areas, whilst the slighter cases fall out of consideration. Moreover, owing to the greater difficulty of treating surgical cases at home, a larger proportion than of medical may gain admission to hospital. Hence the relative frequency of cases needing surgical treatment may tend to be exaggerated. More complete statistics might be obtained by combining all cases as seen in general practice, whether slight or severe. Yet here also a difficulty arises regarding the extremes—very slight illness, relieved by home remedies, or after one medical visit, on the one hand; and, on the other, cases dying of obscure causes, not recognised as appendicitis, owing to the lack of post-mortem examinations.

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[1] Remarks made in opening a discussion at a meeting of the East Sussex Medico-Chirurgical Society, at St. Leonards, on 21st May 1901.

A Clinical Classification:—

1. CÆCAL DISTENSION; RETENTION IN THE CÆCUM AND APPENDIX; TYPHLITIS STERCORALIS.
2. PERITYPHLITIS; PERITONITIS AROUND THE CÆCUM, AND APPENDIX.
3. APPENDICITIS—
    - (*a*) Acute perforating or fulminating Appendicitis.
    - (*b*) Suppurative Appendicitis—Sthenic, Asthenic, Septic Extension.
    - (*c*) Relapsing and Recurring Appendicitis.
    - (*d*) Chronic Latent Appendicitis with Septic Anæmia.

1. CÆCAL DISTENSION; RETENTION OF FÆCAL MATERIAL IN THE CÆCUM AND APPENDIX; TYPHLITIS STERCORALIS.—The important feature in the onset of this class of case is the distension of the cæcum with fæcal material—solid, semi-solid, liquid, gaseous. It is this distension, the result of the decomposition of the retained contents, which constitutes the illness.

Owing to changes in definition and nomenclature, it is undoubtedly the fact that much confusion reigns at the present time about this section of the subject, especially by the way in which the term typhlitis has been replaced by that of appendicitis. If we turn to the article by Oliver, in the first edition of Quain's "Dictionary," 1883, under the heading "Cæcum, Typhlitis," we find that it includes that of retention in the cæcum as well as that of disease of the appendix; the same applies to the article on typhlitis by Fagge, in the first edition of his "Medicine," 1886. Later than this, attention was chiefly directed by Treves to perityphlitis, the local peritonitis around the cæcum, but especially around the appendix, and by American writers to the inflammation commencing in the wall of the appendix itself. Owing to the fact that evidence of inflammation of the wall of the cæcum is but rarely met with, either at operations or post-mortems, the anatomical changes found being nearly always situated in the appendix, not only has the term typhlitis fallen into disuse, but the clinical state to which the name was applied, cæcal distension and retention, tends to be overlooked. It is no longer regarded as a clinical entity deserving of a separate article. In the "Encyclopædia Medica," now appearing, if we turn to the word "Cæcum," we find merely a reference to the article "Appendicitis"; in Clifford Allbutt's "System," the article by Treves is headed "Perityphlitis" alternatively "Appendicitis." Thus any one seeking information on a subject of undoubtedly great frequency in general practice will not find in such recent works on medicine anything under a main heading corresponding to the old heading "Typhlitis." What is now said of it under "Appendicitis" is only subordinate. But let us compare what was formerly treated of under "Typhlitis" with what is now put under "Appendicitis." Fagge says: "I have, indeed, a strong conviction that no case in which the disease can be diagnosed as being seated in the cæcum ever terminates fatally, if judiciously managed. The essential points are, that the patient should be kept perfectly at rest, that his diet should be strictly limited to slops, that he should not be allowed to take a single dose of aperient medicine, and that opium should be given freely." Physicians and general practitioners will largely endorse Fagge's statements with regard to the recovery of their patients under medical treatment, although there are differences of opinion about the administration of aperients and opium. It must be quite clear to every one that Fagge is speaking of a class of case different from those described under "Appendicitis." M'Burney says: "No medical treatment of approved value has ever been presented to the profession, and the pathology of the disease renders it extremely unlikely that any such treatment will ever be discovered. In other words, every case of appendicitis is liable, sooner or later, to demand surgical interference for its cure." Dieulafoy makes the same statement: "From the time of my first communication to the Académie, in 1896, I have stated, and I repeat it with an entire conviction, there exists no medical treatment of appendicitis." Again: "The surgical treatment is the only rational treatment of appendicitis." We are forced to regard the statements of these authorities as each in itself incomplete. Dieulafoy clearly confines his view to the cases marked post-mortem by pathological changes in the appendix; M'Burney, to the severe cases needing surgical treatment, which have come under his notice; Fagge, to the cases which are seen chiefly by the general practitioner, and by the consulting physician. These last cases, to which Fagge refers, are by no means absent from hospital and other records. The statistics published by Renvers, in 1881, are most striking, especially since they are concerned with young men. Of 2000 cases observed in the German army, 96 per cent. recovered; of fifty-three cases observed by Renvers personally, three died. The etiology of the cases was constipation: the soldiers sweated profusely during long marches in heavy uniform, and lived chiefly on a diet of ryebread and sausages. At the very beginning there was present a considerable, easily felt swelling in the ileo-cæcal region. This was first well described by Burne in 1835, then physician to the Westminster Hospital.

A distended cæcum, as recognised by palpation and percussion, is primary, and exists before the onset of pain, although the pain be the reason for attention being drawn to the case. And the distension is the product of constipation, whether the constipation be absolute, or because the motions have for some time been irregular and insufficient in amount. This is made worse by the swallowing of unmasticated or indigestible food, or food in irregular quantities.

The distended cæcum is recognised by its outline, also by its contents—hard scybala which have often been mistaken for malignant disease, doughy motions which yield to the finger, a mixture of fluid and gas which gurgles under the fingers, or the cæcum may be distended with gas only and give a tympanitic note. The pain may not be marked; or, on the other hand, the patient is attacked with acute colic, during the paroxysms of which he is doubled up, and the abdominal wall is so rigid that the distended cæcum cannot be easily made out.

The patient often vomits at first, but this does not continue. The temperature may not rise, or the rise which takes place does not persist. The signs of appendicitis are absent. The special feature is the rapid and complete relief which follows medical treatment, *e.g.* a castor-oil enema, or calomel by the mouth. Indeed, castor-oil, if it can be taken, is not followed by the harm attributed to aperients by Fagge, although it is wise to avoid those aperients which cause excessive peristalsis. There is no need to administer morphine, except just enough to relieve the pain until the bowels act. To administer opium freely is to delay complete relief and to render the motions more scybalous.

Scybala, foreign bodies, and persistent retention may lead to ulceration and perforation of the cæcum, a result I have seen several times from obstruction in the colon beyond. Although so quickly relieved, it would be well if such cases were kept longer under observation. Not only by that means might a return of the distension be prevented, but also in those cases of only partial relief, where some distension of the cæcum still persists, an early diagnosis might be made of malignant obstruction, *e.g.* in an obscure situation like the hepatic flexure. Or it might thus be discovered that inflammation had already extended beyond the cæcum so as to set up some perityphlitis.

2. PERITYPHLITIS.—This is a term especially used by Treves, to mean a peritonitis localised in the region of the cæcum without denoting the seat of origin of the inflammation. It is relegated to the background by many writers of late, who lay stress almost entirely on the inflammations commencing in the wall of the

appendix itself—the peritonitis appendicularis. It is nevertheless a class of case worthy of note in distinguishing between medical and surgical treatment. Its especial clinical sign is pain and tenderness in the cæcal region, without any exact localisation and without any enlargement of the appendix being perceptible. Whilst undoubtedly perityphlitis is often secondary to inflammation of the appendix, and a change in the wall of the appendix may only be discovered on microscopic examination, yet the most likely general explanation is, that simple perityphlitis is due to toxines, the result of the decomposition of fæcal material, whether in the cæcum or in the unaltered appendix. The perityphlitis may be serous, and leave no adhesions behind on resolution. From a boy who had had four distinct attacks, I removed a perfectly normal free appendix; and in a more recent case, published in the *Lancet Mirror*, I found a large amount of serous fluid in the abdominal cavity, without the appendix being altered or adherent. More attention is naturally directed to the fibrinous cases, owing to the adhesions formed. Sometimes we can obtain good evidence of extension from the cæcum. A man was recently sent home to me, with full notes by Dr. White, from the Assouan Nile Reservoir Works. He had suffered from attacks of colitis, whether the result of the climate, water, or food, but with each attack the pain became more concentrated in the right inguinal region. I found perityphlitic adhesions binding down and kinking an appendix, which was itself unaltered, as confirmed by microscopic examination. In other cases the perityphlitis has clearly been an extension, especially from the pelvis in women.

The special signs of perityphlitis are those of local peritonitis, with tenderness and rigidity of muscles, without, on the one hand, signs of distension of the cæcum, or, on the other, of any enlargement of the appendix. The pain is not so paroxysmal, but is markedly increased by pressure. Along with this there is some elevation of the temperature and of the pulse rate. The patient will not be altogether relieved by an aperient; indeed, the case may be better diagnosed by the tenderness remaining after the bowels have been opened.

Uncomplicated perityphlitis is amenable to medical treatment. In order to avoid recurrence, intestinal decomposition from constipation, etc., must be prevented, the abundance of lymphatic gland tissue in the wall of the cæcum and appendix rendering the absorption of toxines from the intestinal canal easy. Care must be taken, by examination after recovery, to make out those cases in which the appendix has become involved by adhesions. For if the appendix is kinked, retention and decomposition of its contents, and the constriction of its arterial supply, may bring on an attack of suppurative appendicitis.

3. Appendicitis.—If we can distinguish the numerous slighter cases of cæcal distension and of uncomplicated perityphlitis, which

are amenable to medical treatment, we shall turn to appendicitis proper, with the conviction that it is essentially a disease for surgical treatment. It is a disease which commences in the interior of the appendix; and although it may remain for a time limited by the serous coat, yet it is always potentially the source of a virulent septic infection. Either the septic inflammation spreads through the peritoneal coat, and sets up suppuration beyond, or gangrene of the appendix results from the arrest of the circulation through its terminal artery. The starting-point of appendicitis is retention of the mucus and fæcal material in the appendix, which ceases to empty itself by peristaltic action. As far as the appendix is concerned, this retention appears to be connected with constrictions and kinks of congenital origin, really slight variations from the normal in length, position, and size of lumen, such as are especially frequent in vestigial organs like the appendix. This congenital origin seems to be the source of appendicitis in young people, and when occurring in members of the same family or by inheritance.

The neck of the appendix may be constricted, and so gangrene be caused, by the appendix becoming displaced into an external hernia or into a retrocæcal pouch. In the healthy appendix the organism generally found is the colon bacillus, less often streptococci, staphylococci, and perhaps other forms. These organisms, especially the colon bacillus, are likewise found in the diseased appendix and in the septic extensions beyond the appendix. Whilst the decomposition of mucous and fæcal material is supposed to produce toxines which set up simple inflammation in and around the appendix, the growth of the colon bacillus and other organisms is favoured; and when a lesion of the mucous membrane takes place, these previously saprophytic organisms now become pathogenic, and cause virulent septic inflammation wherever they penetrate.

The alternative supposition is, that the real organisms causing the septic changes have not yet been identified. True foreign bodies are only found in the appendix very rarely indeed; early observers were misled after a superficial examination. Generally fæcal concretions, "coprolites," are found; true enteroliths, where the fæcal constituents are mixed with calcareous material, are less common, the calcareous material being derived from an inflamed wall, as in the formation of tonsillar concretions and rhinoliths. Tuberculosis and actinomycosis occasionally occur, set up by the special organisms attacking the wall of the appendix.

The ultimate connection of appendicitis with some congenital abnormality affords an explanation of the frequency in young people. Fifty per cent. of the cases of appendicitis, according to the table by Hawkins, occur in patients under 20 years, 10 per cent. between 5 and 10 years, and 40 per cent. between 10 and 20 years. The onset in young people is often without warning; it is in the older patients that we mostly find evidences of previous intestinal derangements. Male cases are in excess, especially among the young. Some have found as large a proportion as 80 per cent. of males to 20 per cent. females, the smaller incidence in the latter being attributed to the additional blood supply of the appendix from the right ovarian artery. Neither extreme of age is exempt; a case at 7 weeks is noted. My earliest case was first attacked when aged 10 months. Several relapses followed; and when I removed the appendix, at 3 years of age, it was thickened and buried in dense adhesions. Treves mentions the case of an edentulous man æt. 72 when first attacked, and there have been older patients still. A man, æt. 70, was admitted under me with moist gangrene of the whole upper thigh, which was traced post-mortem to a diseased appendix.

Clinical signs of appendicitis.—There are two clinical signs of appendicitis—alterations perceptible on palpation, and the special pain.

Palpation of the appendix is carried out by pressing the appendix backwards against the ileo-psoas muscle. The junction of the cæcum with the appendix is approximately behind M'Burney's point, external to the right rectus abdominis muscle, and to the line of the external iliac artery. It is possible in some to feel the normal appendix, which then slips from beneath the examining fingers, feeling like a flat band, and is painless. When inflamed, the appendix feels hard and round, unyielding, or partly moveable, and tender under pressure. The enlarged appendix may be more easily felt under anæsthesia, when the hand on the abdomen may be aided by counter-pressure on the loin or by digital examination of the rectum or vagina.

Naturally, great care must be exercised when suppuration is already likely to exist, lest a rupture of the abscess take place. The appendix may not be definitely made out, only a thickening or resistance be perceived in the tissues around it. From various causes, *e.g.* fatness, rigidity of the abdominal muscles, intestinal distension, especially of the cæcum when the appendix lies behind it, even a marked enlargement may not be distinctly felt. In a woman it may be difficult to distinguish the appendix from the right ovary and tube—indeed, they may adhere. Early malignant disease and thickened masses of omentum may be confused with appendicitis. But in such cases an exploratory operation is equally desirable. It is now generally recognised that the more definite the appendicitis, the more is the pain localised in the neighbourhood of M'Burney's point. The chief centre of pain and tenderness is shifted away from M'Burney's point, according to the displacement of the appendix or the extension of the suppuration, *e.g.* over the brim of the pelvis towards the rectum or vagina, and upwards behind and outside the colon towards the loin. The local character of the pain felt by the patient, and of the tenderness on pressure, is a very constant feature of appendicitis when established. It is only at the onset that the pain is general, or referred to the region of the umbilicus.

(*a*) *Acute perforating appendicitis.*—This is a class of case for which the only treatment is an immediate operation, if it is to be successful. The commencement of the illness is sudden, and has an abdominal character, the symptoms being those generally associated with perforation or strangulation of the intestines. There are also more or less of localising signs, but these have a tendency to rapidly merge into those of general septic peritonitis, when the success attending surgical interference becomes more and more doubtful. In the first place, we must expect this accident without previous warning in young people, *e.g.* schoolboys, in whom some slight injury, a strain or blow in the cæcal region, has often seemed to determine the perforation of the appendix by a fæcal concretion. Similar general or local symptoms may occur with intussusception, or with strangulation by bands in connection with Meckel's diverticulum; both cases also requiring prompt surgical measures. Acute renal colic in young people is usually attended by pain radiating from the very first to the groin, also into the testicle, which is drawn up, and the urine and micturition are altered. In appendicitis it is only some time after the onset, when the appendix is fixed near or in the abdominal ring, or prolapsed into the pelvis with commencing suppuration, that we have such radiating pains and frequent micturition.

Perforation of the appendix into the peritoneal cavity in older patients seldom occurs without previous warning. Perforation of the appendix occurs occasionally in the course of typhoid fever, during the third week or later, in about 3 per cent. of all cases of perforation. Naturally it is in the typhoid patients who have not taken to their bed (ambulant type) that perforation is likely to be overlooked at first. Perforation of a gastric or duodenal ulcer, volvulus, rupture of a distended gall bladder, or of a pyosalpinx, are all cases requiring laparotomy. The only difference as to treatment between them and acute perforative appendicitis is in the position of the abdominal incision. The two important conditions to exclude is that of lead colic, and of the occasional cases of typhoid fever which begin with an acute onset of pain in the cæcal region. I have known of a case of the latter explored for acute perforative appendicitis, which afterwards recovered well from the typhoid fever; but there must have been great risk involved, especially from bad healing of the abdominal wall.

Generally the signs of primary perforation of the appendix are sudden in onset and acute; then there occurs a period of partial quiescence, more marked whenever opium or morphine are administered, to be followed by the development of general septic peritonitis. The patients nearly always vomit, at first once or more, then the vomiting ceases for a time, to return with the general peritonitis. The pain at the time of perforation may be intense; or it may be intermittent, rising to agony with incomplete remissions. It may be generalised around the umbilicus or localised from the first. Taken as a whole, the pain gets less as the patient goes from bad to worse. Unfortunately, as rendering diagnosis more difficult, the pain may be throughout very slight. Treves instances its absence in two cases, both men over 50; no morphine had been administered; and in both cases death took place from toxæmia in seven days. One man spent some hours in applying massage to his abdomen, and the other drew frequent attention to the absence of tenderness by slapping the abdominal wall.

Generally the abdomen is rigid and tender, especially in the right inguinal region. There may, however, be merely a slight tension of the right rectus abdominis, as if to protect the appendix. At first the abdomen may be retracted, then it becomes more and more distended, and the meteorism is not relieved by purgation.

The temperature is a very uncertain sign; at first slow or even subnormal, it rises sometimes with a rigor; sometimes, whilst the limbs are cold, a thermometer in the rectum shows a marked rise. As the patient gets worse the temperature falls irregularly, or remains between 100° and 102° F. It may rapidly rise before death, or fall below the normal. The nine charts included by Treves in his article on "Acute Peritonitis" in Clifford Allbutt's "System of Medicine," show how unreliable is the temperature chart. The state of the tongue is a far more reliable factor in prognosis; at first covered by a more or less thick brownish fur, it quickly becomes dry and shrunken, although due allowance must be made for dryness, the result of mouth-breathing or of opium administered. The pulse rate is the most trustworthy sign of the condition of the patient, the rate being taken regularly by the nurse, so as to prevent any possible doubt of emotional disturbance produced by the doctor's visit. Although occasionally the effect of the collapse attending the onset is to make the pulse slow, yet it afterwards quickly rises. A pulse rate which is steadily rising, is already 110 or more, is the best of all indications for the urgent need of an operation. Where opium or morphine has been given, the fact that the pulse is rising or has reached that rate, however quiescent the symptoms, is a stronger indication still, for the tendency of opium and morphine is to render the pulse rate slower.

Palpation yields very little information, being obscured by the tympanites, but the finger should always be passed as far up the rectum as may be. As distinct from the discomfort caused by the finger passing through the anus, there is, in commencing general and pelvic peritonitis, a marked tenderness in the upper part of the rectum where it is normally quite insensitive.

It is hopeless to expect success if the operative treatment is delayed, and it will be doubly unfortunate if the patient has been allowed to reach advanced peritonitis, owing to the symptoms having been masked by opium.

The incision should be the iliac one, so that no more of the peritoneal cavity need be exposed than is absolutely necessary. The appendix must be excised; it is generally non-adherent, and more or less gangrenous. The earliest operation I have done was twenty-six hours after the sudden onset of the first symptoms. The appendix was gangrenous, it contained a fæcal concretion, and was just on perforating. The case recovered well. The infected area of the peritoneum and intestines must be well wiped and sponged out. If more room is required, the incision should be extended back towards the loin, which will allow of the whole peritoneal cavity being sponged or irrigated. Plugs of iodoform gauze are inserted into dependent pockets, and the rest of the wound sewn up. Such patients require stimulating by brandy per rectum, or by strychnine injections. Morphine and atropine injections will check vomiting and restlessness. It is necessary to get rid of tympanites, either by a turpentine enema or with calomel by the mouth.

In diffuse septic peritonitis, the cases which have the most purulent fluid are the more favourable. Richardson has lately reported three consecutive successes. Where there is much distension of the intestines, and the peritoneum dryish and covered with a sticky fluid, the prognosis is hopeless.

(*b*) *Suppurative appendicitis.*—The clinical aspect under which suppurative appendicitis appears may be divided into two types, sthenic and asthenic.

(1) Sthenic type.—There is in this form of appendicitis no difficulty, generally speaking, as regards the diagnosis, for all the symptoms are acute. Likewise as to its course, if an acute case be carefully examined, at least twice a day, there should be no difficulty in deciding when suppuration has set in. It is not wise to put entire confidence in statements, such as that suppuration does not appear until the fifth to the tenth day of the illness. Such a statement is doubtless true on the average, but we cannot fix for many patients the exact date of the onset; and, especially in relapsing cases, an abscess may form before the symptoms of the attack have existed two days. Death has taken place on the fifth day of an illness, and post mortem a pint of pus was found in the appendix abscess. In a sthenic case all the symptoms are well marked; the pain is acute, the abdominal wall rigid, the appendix and the surrounding tissues form a distinct tumour. The patient vomits, has a thickly furred tongue and a high temperature. Such a case will yield rapidly to medical treatment, or an abscess will forthwith form. Then there will be a boxy percussion note over the perityphlitic tumour, the skin pitting

owing to the inflammatory œdema, and ultimately there will be fluctuation, although it is most undesirable that the incision should be postponed until this sign has appeared, for the wall of the cæcum may by that time have sloughed, so that a fæcal fistula is left, or the abdominal wall is so far destroyed that a ventral hernia is rendered inevitable. As suppuration sets in, the temperature often falls. The pulse rate, which has risen with the temperature, no longer follows the latter, but continues rapid, even rising further in rate. This divergence between the course of the temperature and of the pulse rate is of great importance in noting the onset of suppuration. As the abscess extends towards Poupart's ligament, there may be flexion of the hip, with pain extending down the cord to the testicle, or spreading outwards to the loin when the pus is tracking up behind or outside the colon. Along with the sudden extension of an abscess there may, however, be a subsidence of pain, but other signs of worsening will then be evident. Hip-joint disease and inflamed glands in the groin are really not likely to be confused with appendicitis.

(2) Asthenic type.—It is much more difficult to detect the onset of suppuration in a patient where the inflammation is of the low or asthenic type. In such the closest attention is required, so as to consider fully every point in forming the diagnosis. The development of the suppuration is slower, a diffuse septic inflammation without a circumscribed abscess, so that there is always danger to life from its insidious course. The asthenic type is not necessarily connected with a weakly patient. A perfectly healthy strong man may develop an appendicitis of the asthenic type, which will be difficult to distinguish, unless definite attacks of appendicitis have previously taken place. In asthenic cases the local signs of appendicitis, although slight, will generally be noticeable—the pain at or near M'Burney's point, and the inflammatory enlargement of the appendix as felt by palpation. Suppuration may, however, set in, and progress without marked tenderness or œdema of the skin, or fluctuation. A dry brown shrunken tongue, a pulse rate increased to 110 or more, increasing tympanites with persistent constipation or stinking motions, all point to suppuration. But, further, the closest watch must be kept for signs of septic extension, such as fulness—increased resistance of the muscular walls, tenderness, induration or œdema of the skin, along with continuance or increase of the general symptoms. The following varieties of septic extension have come under my notice, namely, towards the loin, the pelvis, through the layers of the abdominal wall upwards towards the liver, upwards and inwards to the umbilicus, or transversely over the middle line to the left groin or loin. General peritonitis may follow, or a subhepatic, splenic, or subdiaphragmatic abscess form; fatal pylephlebitis or cholangitis is ushered in by severe rigors, jaundice, and enlargement of the liver. A distension of the gall bladder

only, with slight jaundice, may, however, be simply due to temporary congestion, spreading up the common duct from the duodenum, and be relieved by a dose of calomel. An abscess has formed in the region of the gall bladder without any signs in the right inguinal region, owing to the cæcum and appendix remaining congenitally undescended in the neighbourhood of the liver. Septic pleurisy or pneumonia may set in, or an abscess perforate the diaphragm, penetrate the lung, and be coughed up. I have seen an abscess tracking down beside the rectum into the ischio-rectal fossa, so as to require incising beside the anus — an abscess tracked from the appendix along the sheath of the blood vessels into the thigh, setting up emphysematous gangrene of the whole upper thigh. The iliac vein, or vena cava, may become involved, and if the clot breaks down, fatal pyæmia follows. It often happens that the clot does not itself become septic, so that on the recovery of the patient a chronic œdema of the limb remains. The fact that this is often seen on the left side, suggests that in such cases, where the clot is not septic, the thrombosis is due either to the feeble circulation or to the absorption into the blood of materials favouring blood coagulation, as in typhoid fever, except that in the latter case the trouble is generally a phlebitis and thrombosis of the veins of the leg, instead of obstruction in a main vein. When the appendix adheres to the bladder, frequent micturition and hæmaturia may be set up, and the pus may burst into the bladder.

A quiet extension of the septic inflammation to the pleura must be noted early; it is very useful for the nurse to record the rate of respiration, for she will then be able to draw the attention of the doctor to this complication. An exploring syringe may simply remove turbid serum, containing the colon bacillus, and having a foul odour. In a case of this kind, on opening the chest, very little fluid escaped, but there was a distinct fæcal odour blown out whenever the patient expired, and the pleural complication subsided. The above is the only use for an exploring syringe in connection with appendicitis, otherwise its employment is to be entirely condemned.

Even more than in the sthenic cases no reliance can be put on the statement that suppuration does not appear before a certain day. The statements as to the onset of the illness in an asthenic case are always unreliable. Suppuration may be found on apparently the second day of the illness. It very often happens that the patient or his friends can afterwards remember symptoms which antedate the onset.

As aids in distinguishing typhoid fever from asthenic suppurative appendicitis, two blood tests have been introduced—(1) Widal's reaction as a sign of typhoid fever, and (2) leucocytosis, an increase to more than double of the white cells in suppurative appendicitis and peritoneal perforation; the normal proportion of the various forms is maintained, so that the overwhelming majority of cells forming the leucocytosis is polynuclear. This is absent in typhoid fever without perforation.

Treatment of suppurative appendicitis.—Whenever a diagnosis of septic appendicitis, with probable extension through the serous coat, has been made, it is most important to adopt only the iliac incision. It seems such an additional risk to the patient to make the incision in the right semilunar line, for this leads directly into the peritoneal cavity. I have read of nineteen consecutive fatal cases happening to one surgeon. The normal appendix lies *within* the peritoneal cavity; but in suppurative appendicitis, as distinguished from acute perforative appendicitis, the appendix is, surgically speaking, *outside* the general peritoneal cavity, owing to the adhesions which have previously formed. I have, in operating by the iliac incision, never seen general peritonitis follow the operation, however early. The aponeurosis of the external oblique is divided along the course of its fibres; the muscular fibres of the internal oblique and transversalis are split, not divided; and the transversalis fascia is torn open with anatomy forceps. Then the unopened peritoneum is gently pushed aside by the fingers from the iliac fossa, the fingers searching in the direction of most resistance until the abscess cavity is reached. The indurated appendix may be felt by pinching up a fold of peritoneum between the thumb and finger. The base of the appendix can thus be exposed by scratching through with anatomy forceps; and then by searching along towards its distal end, between the peritoneal coat and the inner wall, any small abscess connected with the distal end of the appendix will be exposed without opening up a communication with the abdominal cavity. It is generally wise in acute suppurative cases not to disturb the friable, rotten, septic wall of the abscess in a search for the appendix, although, if it lies exposed in the cavity, and the condition of the patient permits, this may be done, and thus a second operation avoided. The abscess cavity is cleared of pus and fæcal concretions and gangrenous sloughs, but the wall must not be scraped, lest the cæcum be perforated and a troublesome fæcal fistula result. The abscess cavity is filled with iodoform gauze, or a counter-opening made, *e.g.* in the loin, through which a drainage tube is passed, by means of which the cavity can be frequently irrigated. Later on, when all the inflammation has subsided, and the general condition of the patient is good, the appendix is dissected out.

(*c*) *Relapsing or recurring appendicitis.*—After the passing off of a subacute attack of appendicitis, there often remains some slight symptoms—a tenderness or sense of discomfort in the right inguinal region, which is increased by firm pressure, and the appendix is felt more or less distinctly to be the seat of this tenderness, and to be somewhat enlarged. This clearly discloses that chronic appendicitis persists, so that when the inflammation returns, in an acute or subacute form, it is more correctly spoken of as relapsing appendicitis, since there has been no entire subsidence between the attacks. The more attention is paid to the state of the appendix after an attack, the more it will become evident that relapsing appendicitis is the more common, and true recurrence after complete disappearance of the inflammation rarer. This is an important distinction practically; for, should evidences of chronic appendicitis remain after the attack, a relapse is practically certain, and the patient should be advised to submit to removal whilst the operation is safe and the cure practically certain. The discovery of a persisting chronic appendicitis affords much better ground for recommending the operation to a patient than that based on statements as to the number of the attacks—often very doubtful evidence. The patient will be spared the anxiety of being told to await another attack, which may or may not take place, and of which, if it does, the severity cannot be foreseen. An examination of the appendix being negative, we may consider the previous attack to have been one of the forms already referred to under distension of the cæcum, typhlitis stercoralis, and perityphlitis, when the patient may be told that with certain care as to diet, bowels, etc., he may not have another attack. Granted the occurrence less often of true recurring appendicitis, in which a careful examination does not reveal any evidence of chronic appendicitis between the attacks, although during the attack there is swelling of the appendix and well localised pain, then it will be a question whether by further medical treatment the recurring attacks can be prevented, or whether excision of the appendix should be adopted. I have already referred to two such cases where I have excised a normal (naked eye and microscopic) non-adherent appendix.

(*d*) *Chronic latent appendicitis.*—Insidious cases arise in which general ill health, septic anæmia, is due to a continuous yet latent appendicitis. There is no class of case more difficult to diagnose. Suppuration, although it finally appears, may be delayed for weeks or months, or, forming early, may at first discharge quietly into the bowel. There is no marked attack to call attention to the disease, and there is often but a small amount of local evidence until it is too late for relief. The patient suffers from malaise, bad appetite, foul tongue, flatulence, slight attacks of indigestion, irregularity of the bowels, loss of flesh, anæmia. It may be that no practitioner is at first consulted, or that attention is directed to other supposed causes of the septic anæmia, *e.g.* pulmonary tuberculosis. A diagnosis has to be reached largely by exclusion, and there should be a careful examination of the cæcal region in such doubtful cases. In several which have come under my observation, unfortunately too late, there appeared to have been no positive evidences of appendicitis until suppuration commenced. As mentioned by Hawkins, Treves, and others, small microscopic abscesses may be present in the wall of the appendix without causing enlargement or adhesions. But I have found, in operating, dense adhesions, showing that the inflammation was in no way of recent date, and it was in these dense adhesions that at length suppuration started. The cases referred to had no warning attacks, but were diagnosed as soon as suppuration set in. The abscess was opened without delay, but death followed either from heart failure or from septic extension. The heart failure occurred suddenly, whilst the patient was apparently going on well, or after repeated faintings. In my experience the most latent cases have been in young men; nevertheless, one case was a young woman, and older people may suffer. In an obscure case a chronic latent appendicitis must be included with pulmonary tuberculosis and typhoid fever, in considering the possible diagnosis, and if there are any suspicious signs in the right inguinal region, an exploration of the appendix before it is too late may be the saving of the patient.

CONCLUSIONS.—For the purpose of this discussion I have classified cases in such a way as to lead to their being clinically distinguished at an early stage.

First, I have referred to distension of the cæcum, the treatment of which is entirely medical. No anatomical lesion need be present; the appendix may not be included in the retention at all; there may be no return of the attack, unless it be from the same cause as before, *e.g.* constipation.

Secondly, Perityphlitis may be set up by decomposition within the cæcum and appendix, or from other causes which may or may not leave adhesions behind involving the appendix. Such cases yield to medical treatment, and need not recur if the production of intestinal toxines be prevented. Or perityphlitic adhesions may kink, and cause obstruction in the lumen of the appendix, and thus the necessity for surgical treatment may arise.

Thirdly, In *acute perforating appendicitis* an immediate operation is the only means of saving life.

Fourthly, In *acute suppurative appendicitis,* whether of the sthenic or asthenic type, the appendix should be exposed as soon as the diagnosis can be made, by keeping outside the general peritoneal cavity, draining the abscess, and removing the appendix at a later date.

Fifthly, Relapsing should be distinguished from *recurring appendicitis* by careful examination after the attack, and if signs of chronic appendicitis are found, the appendix should be removed at once.

Sixthly, General septic anæmia may be set up by a *continuous latent appendicitis,* in which there is great danger of the disease not being recognised until too late for successful surgical interference.

Finally, To answer questions often asked, Can a boundary line be drawn in *obscure* cases, between the indications for medical and surgical treatment? I agree with those who put most trust in the pulse rate, when drawing the line in acute cases. A pulse rate, rising to 110, or remaining about or above that rate, points strongly towards immediate exploration of the appendix. A pulse rate below 100 suggests an expectant medical treatment. To take exceptions, the pulse rate may be above 110, and yet medical treatment be proper, in typhoid fever without perforation, also early in cæcal retention before the bowels have moved. The pulse may be below 100, and yet surgical treatment be required, when much opium has been given; also, where there is collapse from sudden extension, whether to the peritoneum or outside it. The septic influence which quickens the pulse is neutralised also when there is jaundice, which includes absorption of bile acids, tending to slow the pulse, as in simple jaundice. Thus these exceptions are not real objections to taking the pulse rate as a test in an *obscure* case, because other evidences are present to qualify the test. I have not seen or read of any case where, the pulse remaining slow, there was not other sufficient evidences of suppuration.

In chronic cases the question of treatment turns on a careful palpation of the cæcal region. If no deep-seated tenderness or thickening is discovered, the case should be considered one for medical treatment. On the other hand, tenderness and thickening discovered by palpation indicate an early exploration, which will clear up not only cases of appendicitis, but other doubtful cases, such as cancer of the cæcum, tuberculosis, actinomycosis, and pelvic affections.

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TRAUMATIC SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR, WITH NOTES OF A CASE AND SKIAGRAMS.

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(PLATES III. AND IV.)

THIS accident is one of great interest to surgeons, not only on account of its comparative rarity, but also because of the differential diagnosis, the severe complications of the vascular and nervous supply of the limb, the difficulties of successful treatment, and the effects of the accident on the subsequent growth of the leg. The lower epiphysis of the femur is the largest in the body, and is not grasped by long surfaces, while it is subjected to very powerful leverage through the tibia, and by the numerous muscles attached to the bones in its neighbourhood.

The accident is undoubtedly more common in boys than in girls, and is frequently seen between the ages of 15 and 20. It is caused both by direct and indirect violence, usually the latter, and it is curious to note that many of the cases arise from what may be termed wheel-accidents, or the application of a twisting force. The writer, in his article on the subject,[1] collected twenty-six cases; of these, thirteen were due to the leg having been caught in a wheel while the patient was riding behind a vehicle. In other instances the leg had been caught in a rope, and the epiphysis had been twisted off. The accident is either simple or compound, portions of the lower end of the shaft of the bone in the latter case protruding posteriorly. The displacement of the epiphysis is usually forwards, owing partly to the obliquity of the epiphysial line from above downwards and from before backwards, and due also to the lower end of the shaft being pulled backwards by the attachment of the gastrocnemius to the periosteum, which remains adherent to the shaft at the time of the accident. The sharp posterior edge of the lower end of the shaft is a powerful agent in compressing and lacerating the popliteal vessels and nerves. The displacement may be partial or complete, and although generally forced forwards, the epiphysis has been found to be displaced laterally and even backwards; while there is often some twisting of the epiphysis owing to the action of the popliteus muscle. The growing line is usually detached with the epiphysis, and very frequently a portion of the shaft of the femur, either on the inner or outer aspect, is torn away with it. Numerous cases of compound separation have been recorded, and then it happens that the lower end of the shaft, which is extremely sharp posteriorly, is seen protruding through the skin of the popliteal space, either internally, externally, or posteriorly. In the last event, the popliteal artery is either stretched or ruptured.

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[1] *Ann. Surg.*, vol. xix. p. 310.

The complications of the injury are numerous and severe, and they are immediate and remote. If the fracture be compound, profuse hæmorrhage is met with; as a rule, this is not from the main vessels of the limb, but oozes from the bone, or spurts out from some of the small arterial branches. The main vessels themselves are either pressed upon, stretched, contused, or ruptured partially or entirely, and in some cases there is no pulsation to be felt in the anterior and posterior tibial arteries after the accident, so that the foot becomes cold, and gangrene is imminent, necessitating early amputation. If the vein be injured in a compound fracture, there is considerable liability of septic thrombosis and pyæmia resulting. Injury to the popliteal nerves is not so common as injury to the vessels, but the nerves may be either stretched or lacerated; and in a case recorded by J. L. Little,[1] the internal popliteal nerve was so stretched, and there was so much pain, that amputation was resorted to. The patient subsequently died of tetanus. The knee-joint is not often involved, but sometimes there is a fracture extending between the condyles into the articulation. There is often a good deal of laceration and bruising of the soft tissues of the joint, with synovial effusion or hæmarthrosis. The occurrence of gangrene has already been alluded to, and is a very real danger. Among the later complications are, in compound separation, severe and extensive suppuration, and in both simple and compound fractures acute necrosis and periostitis. Inflammation and suppuration of the knee-joint is recorded in some cases. A popliteal aneurysm has been traced to this accident, and this is well shown in a specimen in the Museum of the Royal College of Surgeons, Edinburgh, No. 138, xx. c. Owing to interference with the growing line at the bone, to misplaced union, and to inflammation as the result of the injury, shortening of the limb follows, varying from half an inch to four inches or more, and genu valgum or genu varum has resulted from mal-union.

The prognosis of the injury cannot be considered as at all favourable, either immediately or remotely, and the integrity of a large number of limbs is interfered with permanently as a result of the accident, but much of the success in treatment depends upon early recognition of the nature of the injury and rapid and complete reduction. If attempts by manipulation fail, there is no doubt that the epiphysis should be cut down upon at once and pushed into place. Many cases of simple separation with the displacement of the epiphysis forward can be reduced by flexing the leg, making traction on it, and pressing the lower end of the diaphysis forward and the epiphysis itself backward. Messrs. Jonathan Hutchinson, jun., and Harold Barnard recommended a plan of reducing the displaced epiphysis, namely, by fully flexing the knee until the heel touches the buttock, and claimed for it a considerable amount of success; but in the following case this method was tried without success, and I have known it useless in other surgeons' hands.

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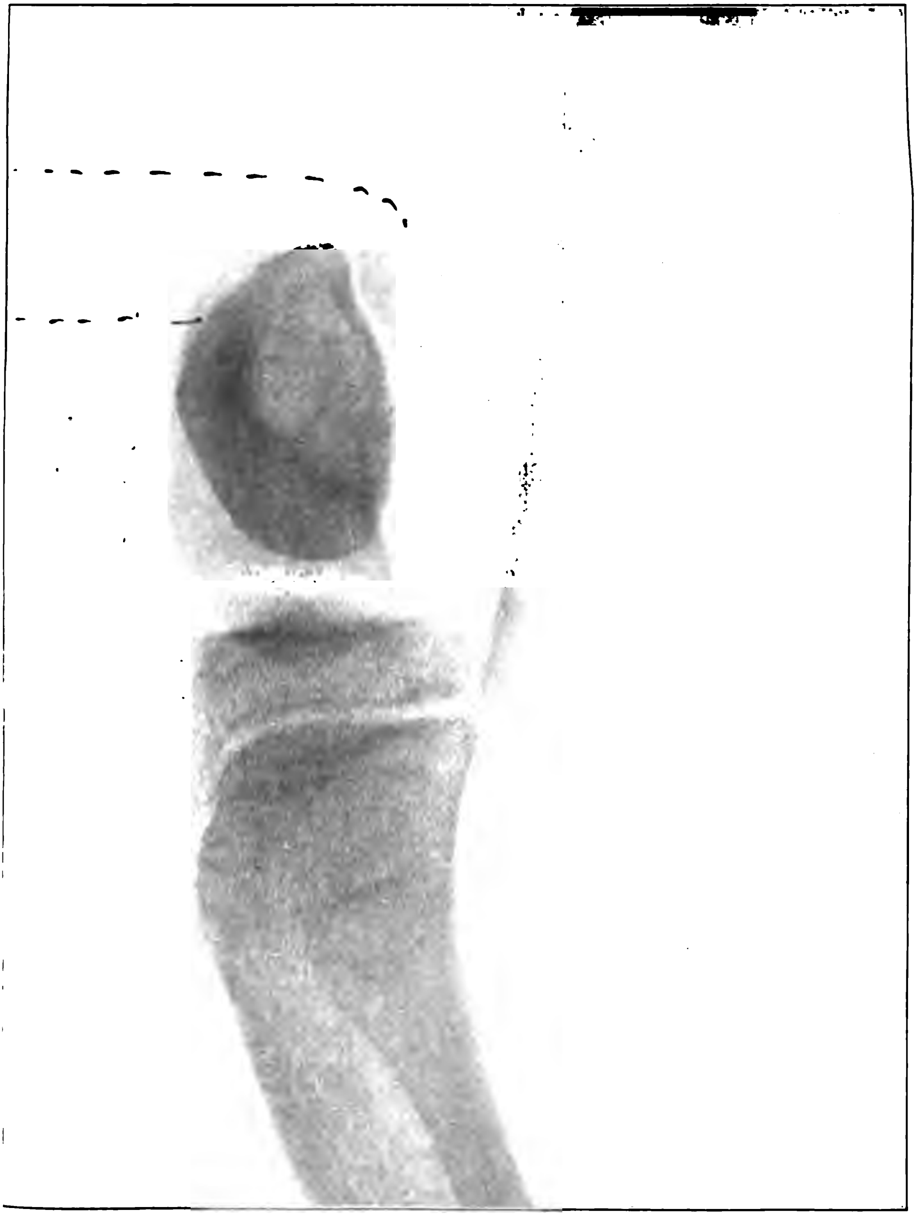
[1] *Illus. Quart. Journ. Med. and Surg.*, Jan. 1882, vol. i. No. 1, p. 24.

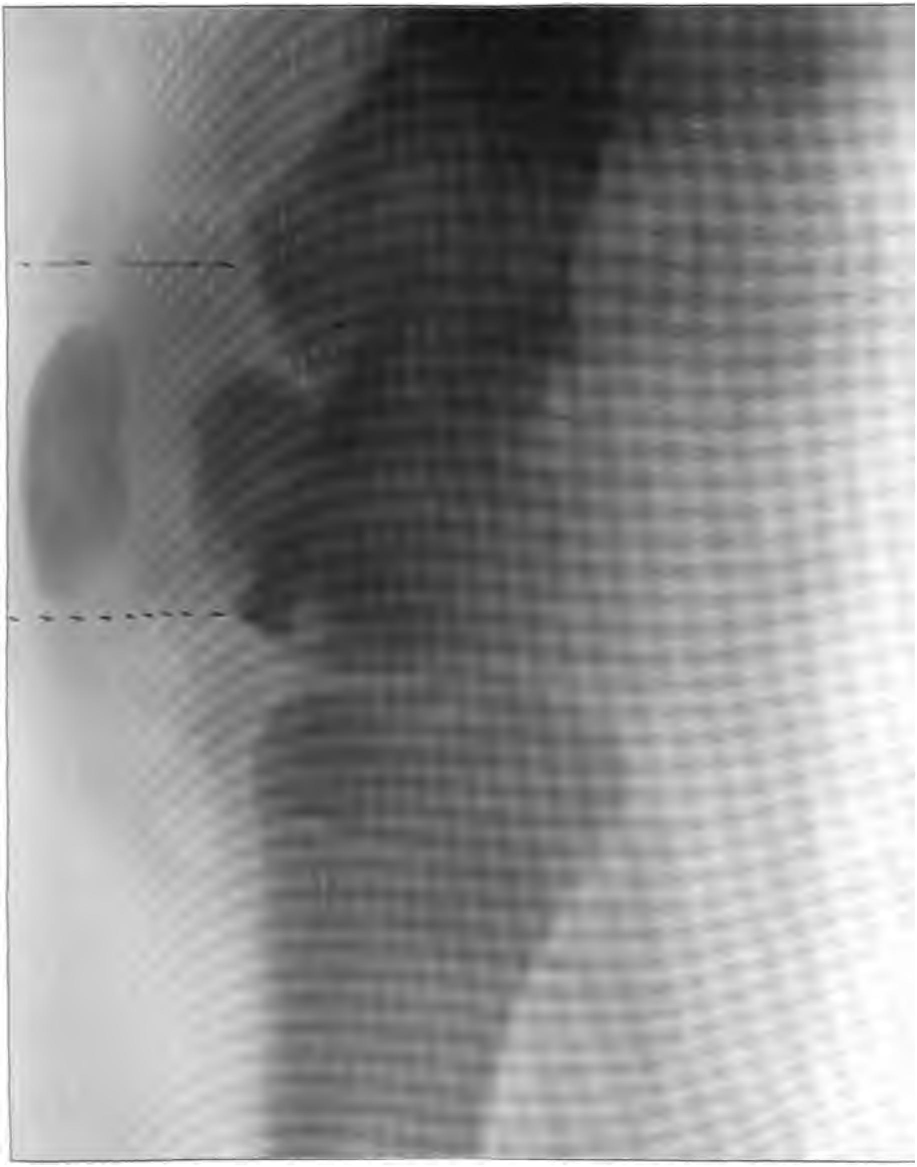
CASE.—*Traumatic separation of the lower epiphysis of the right femur; subsequent rectification by open operation; epiphysis retained in place by a screw; fracture of the middle of the left femur.*—George B., æt. 9, was admitted to Westminster Hospital on October 24, 1899. He was going to school when he ran after a four-wheeled cab and grasped the back rail. In endeavouring to get down, he caught his legs in one of the wheels, and the limbs were carried round nearly to the level of the middle of the door, and the wheel became locked with his legs projecting through the spokes. The child was brought to the Hospital immediately.

On admission, the boy lay in bed with his knees drawn up, and in great pain. There was a slight abrasion on the front of the left knee, and another on the outer side of the left leg. The left thigh was found to be fractured obliquely in its middle, and there was eversion of the foot with 1 in. shortening. There was already considerable swelling around the right knee, which was flexed to an angle of 30°, and the leg was rotated inwards. The patella was intact, but posteriorly two sharp points could be felt almost projecting through the skin in the popliteal space, yet the pulsation of the popliteal artery was evident. Anteriorly, a distinct mass could be felt lying on the front of the femur. The joint could be moved, but no true crepitus obtained. From the nature of the injury, and from the character of the displacement of the femur, a diagnosis of separation of the lower epiphysis of the right femur was made, which was confirmed by a Röntgen ray photograph (Plate III.). The foot was somewhat cold, but feeble pulsation could be felt in the anterior and posterior tibial arteries. Neither of the fractures were compound. The boy was placed under an anæsthetic, traction was applied to the right foot, a reduction of the deformity effected, and the limb was put up on a double inclined plane, and an extension weight of 5 lbs. applied. To the left femur a long Liston's splint was applied, after reduction of the fracture, and the bone was thereby maintained in good position. The boy experienced great pain during the following night in the right knee-joint, and the foot became very œdematous and cold, and there was evident interference with the circulation, and it seemed that gangrene might follow. The angle of the inclined plane, which had previously been about 30°, was now increased to 45°, and after twenty-four hours the foot became warmer, and the œdema gradually decreased. But there could be no doubt that during these frequent manipulations necessary to relieve the pain and the œdema, displacement of the epiphysis recurred, although this untoward occurrence was masked considerably by the great swelling about the knee, both anteriorly and posteriorly. The condition was uneventful until November 21st. It was then quite clear that the epiphysis was still lying on the front of the femur, and was evidently adherent to it, and the intercondylar notch was felt well defined and pointing directly forwards. At this time, too, the sharp lower end of the shaft could be felt in the popliteal space merely covered by skin, and nearly coming through it. Another radiograph was taken, and it was seen thereby that the epiphysis was lying on the front of the shaft, while the shaft itself was in contact at its under part with a small posterior portion of the upper articular surface of the tibia. On November 27th, thirty-four days after the injury, the patient was again put under an anæsthetic, and an attempt was made to displace the epiphysis from its connections by tapping it smartly on its inner side with a mallet, the skin being guarded with thick felt. This attempt resulted in failure, as might be expected. So the tendo Achillis was divided and it was decided to open the knee-joint and replace the epiphysis. A long curved incision was made, commencing at the upper and inner angle of the patella and passing horizontally outwards and then curving downwards for about 3½ in., the total length being 8 in. This incision completely divided the extensor tendon and the upper and outer part of the capsule of the joint. The patella and the adjacent structures were then turned downwards and inwards, and the displaced epiphysis was fully exposed by retracting the soft parts. The epiphysis was found to be so tilted that its articular surface looked forwards, its upper surface looked backwards and inwards, and on the inner side of the epiphysis was a piece of bone the size of a walnut which had been detached from the shaft of the femur with the epiphysis. This piece of bone was taken away, and then the epiphysis was chiselled off the femur, care being taken not to leave any of it behind, as it was thought that the growing line was attached to the epiphysis, and this proved afterwards to be the case. The difficulty now was to lever back the epiphysis between the closely locked tibia and the shaft of the femur. It was not possible to further detach the epiphysis from its soft connections, as these had been left intact on the inner side only. But by applying vigorous extension to the limb, and using a periosteal elevator as a lever, the epiphysis was ultimately forced into position. Then, flexing the knee-joint to a right angle, a gimlet was run through the epiphysis into the shaft of the femur, and a nickel-plated steel screw, 3½ in. long (Plate IV.), driven home, care being taken that its head was flush with the under surface of the articular cartilage of the femur. Six deep sutures were then passed through the soft parts, including the divided portions of the extensor tendon, leaving a small opening for the insertion of a draining tube. The limb was then put up on a back splint with a foot-piece and two side splints.

After the operation the temperature fluctuated between normal and 101°, and he was much troubled with sickness for three days. There was also a great deal of oozing of blood and serum from the tube, but no pus. On the fifth day the drainage tube was removed, and on the twenty-eighth day the wound was soundly healed. On January 3, 1900, it was noted that the limb was not so straight as desirable, there being a considerable amount of genu valgum and the knee-joint was stiff. So on January 8 the boy was anæsthetised, the limb was straightened, some adhesions were broken down, and the leg was put up in plaster.



From a Röntgen ray photograph of a case of traumatic separation of the lower epiphysis of the right femur and forward dislocation of the right tibia, taken three days after the accident.



From a Röntgen ray photograph of the limb seven weeks after the injury and three days after th operation described in the text. The screw A is still *in situ*, and has given rise to no troubl at this date, *i.e.* nearly one and a half years after the operation.

He was discharged from the hospital on January 12, wearing a plaster of Paris splint. The right leg measured 23⅞ in. from the anterior superior spine to the internal malleolus, and the left leg 24⅜ in., *i.e.* there was a difference of ½ in. In April the boy was readmitted, the plaster of Paris taken off, and gentle movements of the knee commenced. Afterwards he wore a trough splint applied to the outer and posterior aspects of the knee.

The final result is, that the left leg is straight, it does not require support, it has 25° of flexion at the knee, and is only ½ in. shorter than its fellow, and the screw has given rise to no trouble whatever and is still *in situ*.

REMARKS.—This case is, the writer ventures to think, interesting and instructive, as it is fairly typical of the features presented in a case of simple separation. The nature of the accident is that which is most commonly described as the cause, and the displacement occurred on to the front of the shaft. Among the immediate complications were pressure on the popliteal vessels with coldness and œdema of the foot, partial dislocation of the tibia on the lower end of the shaft of the femur, and fracture of a portion of the shaft of the latter bone. The great liability to recurrence of the deformity after reduction, was too well shown in this case, and the lesson to be learnt is that during the first week or two frequent examinations should be made to ascertain if the fragments are in good position.

The operation is remarkable when the immediate and remote dangers are considered. Owing to the extensive division of the capsule of the joint, together with section of the whole of the extensor cruris tendon, it was naturally to be expected that some deformity should follow, and such did occur in the form of genu-valgum, but only to a slight degree. Doubtless, unless much care had been exercised in accurately suturing the divided structures, a greater degree of deformity would have followed. That which existed after the operation was only temporary, and disappeared in about nine months, leaving a strong and straight limb. A very interesting speculation at the time of operation was whether the epiphysis would live or not, for in order to get it back into place it had to be separated from its attachments all round, with the exception of a band of periosteum 1 in. in width on the inner side. Then, too, if it did live, would proper growth take place? And this was, of course, dependent upon the question as to whether the growing line had been left attached to the front of the femur or chiselled off with the epiphysis. Fortunately time has shown that both these untoward consequences were obviated. The next difficulty in operating was the position of the vessels. At the posterior part of the false knee-joint were the remains of the posterior ligament tightly contracted, and with the artery, in all probability, knuckled into it. By careful dissection this ligament was divided without injury to the vessel. It was also a moot point, if, in levering the epiphysis back into place, the popliteal vessels would stand the strain; and in addition to these considerations, the all-important question of preventing any septic contamination of the field of operation had to be borne in mind. Then, too, it was interesting to know if the presence of a nickel-plated screw would be tolerated in so important a part as the knee-joint and lower epiphysis of the femur without giving rise to irritation. Finally, could any movement of the knee-joint be hoped for?

Fortunately all these dangers were avoided: the wound healed kindly and well, the epiphysis resumed its normal rate of growth, and in the right direction; the ligaments became firmly united after a time; movement to the extent of 25° was obtained at the joint; the boy is now able to walk without support of any kind to the limb, and the screw still *in sitû* has given rise to no trouble.

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A SHIP OF THE VELDT.

By ANDREW BALFOUR, M.D., B.Sc. (Edin.), D.P.H. (Camb.), *late Civil Medical Officer, South African Field Force.*

(PLATE V.)

ESTCOURT, the Bushman River, and No. 7 General Hospital! Of the three, the last alone concerns us.

Imagine a gentle slope leading upwards from a single line of narrow rails, a slope bearing a central strip of long tin buildings, flanked by row on row of great white marquees, dotted here and there by bell and Indian tents, seamed by roads lined by white-washed stones set at regular intervals the one from the other. People those marquees with sick and wounded men in bed, and convalescents in blue uniforms and red neckerchiefs; scatter scarlet-caped nursing-sisters and doctors in khaki here and there; crowd the tented spaces with orderlies in their shirt-sleeves, coolies in turbans, and Kaffirs in next to nothing; set a Red Cross flag fluttering in two places—and some idea is forthcoming of a General Hospital in Natal.

But a vague notion is thus engendered. It is necessary to work in those wards, to see those sick arrive and leave—leave in divers manners; to smell the vapours of chloroform and of ether in one of those tin buildings; to visit the great stores, the kitchens, the recreation tent, the canvas chapel, and the mortuary; to experience the attentions of myriads of flies, and it may be scorpions and centipedes—ere one can fully appreciate the life, ay, and the death, in such a place.

"Place aux dames," is an injunction which bids us begin our consideration of tented hospital work with that performed by the nursing-sisters. Like all Gaul, the fraternity of nursing-sisters, if one may use an Irishism, is divided into three parts.

There are the Army Sisters proper, from whose ranks the Superintendent and Assistants are supplied; there are the Nurses of the Army Reserve, who form the great bulk of the Sisters; and there are the Colonial Nurses, from Canada, from South Africa, from Australia and New Zealand.

True, there is another class, with whom happily I have had little or nothing to do. These are the famous amateurs who buzzed about the hospitals at Cape Town like flies round a honey-pot, and did nearly as much harm as those winged pests. Decked out in tasteful uniforms, they looked forward to wiping the perspiration from dear Tommy's fevered brow, putting his sheets straight, holding sweet flowers to noses more accustomed to the odours of a camp or a besieged town—and now, forsooth, look backward with anger and wonder at the reception of their valuable services!

All honour, however, to the brave women who have too often sacrificed themselves to aid our sick and wounded soldiers, who have had to do the most disgusting work under the most adverse conditions, under the fierce heat of an African sun, and through the biting cold of nights on the high veldt, who have been overburdened with cases, and yet have struggled on, *sans peur et sans reproche.*

They are, of course, classed as night- and day-nurses. The latter begin work about 9 A.M., continue on duty till 1 P.M. Then comes lunch, and thereafter another spell of work till 3 P.M. A well-earned rest follows till the next term of duty, lasting from 5 to 8 P.M.

When it is remembered that, in the old days, one nurse might have as many as sixty cases under her charge, many of them acute enterics and dysenterics, requiring unremitting attention, and that her only helpers were male orderlies—some good, some bad, some indifferent—it will be seen that her position was not a sinecure.

The night-sisters have also heavy tasks, from 8 P.M. till 9 A.M., in all kinds of weather; for it is not a case of a single big ward and comfortable corridors, but very often a wading from tent to tent in a sea of mud, lantern in hand and gum-boots very much in evidence.

The nursing-sister runs great risks, but the orderly—be he R.A.M.C., St. John's, or St. Andrew's Ambulance Corps, Militia Medical Staff, Imperial Hospital Corps, or merely regimental—runs even greater. This is in large measure due to his own carelessness and lack of ordinary precautions, but also to the nature of his work and the comparative poorness of his diet. A good orderly is worth his weight in gold; a bad one is about equal to his weight in coffin lids. Still, on the whole, every credit must be given to those men, without whom it would be impossible to carry on hospital administration at all. They have long hours, unpleasant work with little glory attaching to it, and many of their mistakes have been the result of ignorance and thoughtlessness, rather than of neglect or inattention. Yet it cannot but be startling to find one, out of the kindness of his heart and the emptiness of his head, presenting convalescing typhoids with bags of chocolate or assorted sweets!

The ward-masters and non-commissioned officers who carry out clerical and other duties are, for the most part, able and energetic men, who deserve every praise, and maintain a discipline alike essential and efficient. Much has been said, and much might be written, concerning the doctors. In such a hospital there is usually a colonel in the position of P.M.O. Under him are a couple of majors or captains, the one in charge of the Medical, the other of the Surgical division; there is a secretary and registrar, also of the R.A.M.C.; and then there are anything from eight to fifteen civil surgeons and perhaps lieutenants. In a hospital containing 1000 beds—more, remember, than the Royal Infirmary can boast—there ought to be a staff of about twenty-two. This, however, is the exception rather than the rule.

I am concerned only with the work of the Civil Surgeon, or Subaltern, of the R.A.M.C.

In the morning he has his ward visits to make, and his serious cases to enter. Above all things he has sundry blue diet sheets to fill up, which, to the novice, are a weariness to the flesh, and tend to induce writer's cramp. He is busy till 1 o'clock, and may be still busier after lunch. As a rule, however, he is free till 5.30 or 6, when he again makes his rounds, and he has to see any special cases at a later hour. In addition, each in rotation has to act as orderly medical officer. This unfortunate being is confined to the precincts of the camp, and begins the day by inspecting meat. His ordinary work has to be done in due course, and is interrupted by milk-tasting, even as the Eastern slave drinks of the wine cup ere it passes to his lord and master. He inspects the dinners, the general sanitary arrangements, the distribution of beer and rum, his labours being lightened perhaps by the fact that these beverages may also be tasted. He must be present when patients arrive, and inspect them ere they go, be they alive or dead, and finally he has to see the night orderlies posted, and is liable to be called upon in any emergency. But little grass can grow beneath the feet of a conscientious O.M.O. Of course many other duties fall to the doctor's lot. He has to be in his wards to receive new cases; he has to circumnavigate the lines at meal times with a cry of "Any complaints?" as monotonous as that of the muezzin calling the children of the Faithful to prayer; he may have to operate, give anæsthetics, and attend to what are known as the morning sick —coolies with vague pains and Kaffirs with the toothache.

Such, with the chaplain, and the quartermaster, who is not a medical man, but is the hardest-worked mortal in the hospital, comprise the crew of this canvas-rigged ship of the veldt, which, as will be shown, may have to withstand gales as fierce as any that lash old ocean into fury.

Let us for a moment consider part of a day's work on this great ship. A shrill whistle echoes and re-echoes amongst the hills to the northward; clear and loud a bugle sounds the assembly. The orderlies promptly fall in, and with those excellent vehicles known as the MacCormack-Brook wheeled stretchers proceed to the little railway siding (Plate V., Fig. 1). Soon a train marked with the Red Cross draws up alongside, and from it emerges a mass of sick and, it may be, shattered and dying humanity.

Here are men who a few days previously have been stout and sturdy soldiers, and who now lie motionless; their tongues like boot-tags, their lips like crinkled leather, the filthy flies battening on the corners of their half-closed eyes, their lips moving in muttering delirium, their coarse khaki stinking—their whole bodies drugged with the poison of enteric. Here is a wretched dysenteric—pallid, wasted to a shadow, a mere bag of skin and bones, tortured by the least movement, possessed of a consuming thirst, exhausted by the jolting of the railway carriage despite every appliance of science. There is a man with his perforated head swathed in bandages; another cheery and on his own legs, with a shattered arm in a blue sling; and with each one comes his rifle and bayonet and belt, which too often he has used for the last time.

But for most there is comfort in store. Soon they are between clean sheets, drinking warm milk or bovril—the feeble with hot bottles about them, the strongest glad to rest. Yet often, very often, as night falls, a quiet shrouded figure will be carried from one of those marquees to a lonely little tent, there to await the mule cart and the Union Jack, and the last words, "Ashes to ashes."

A truce to such gloomy thoughts, and let us turn to the day when the hospital had to withstand the fiercest "dust-devil" known in Natal for fifty years—a hurricane accompanied by driving clouds of dust and sand and small pebbles, a rush of the storm-fiend from the north and east which well-nigh laid the place in ruins.

It came with the coming of night, but it was not till the following morning that its full fury smote the great marquees. One could scarcely stagger along against the gale, which it was painful to face, while on every side there scudded past papers, tin cans, hats, helmets, and all sorts of hospital equipments. Now a bath trundling on its side would emerge from the brown haze, and vanish; anon a sheet of corrugated iron would drive clanging across the veldt. The roar of the wind mingled with the frantic flappings of many tents, and the loudest voice sounded like a whisper. Eight-and-twenty marquees and nearly fifty bell tents bit the dust, and it was arduous and difficult work rescuing the patients from their canvas graves (Plate V., Fig. 2).

The loss was great, the exhaustion was great; but the storm did good, by permitting the substitution of the finest of all hospital tents for the unstable marquee—I refer to the European Private, Indian Pattern.

The much vaunted tortoise tent, but recently praised in the *British Medical Journal*, many look upon as distinctly inferior to the E.P.I.P. It is excellent in fine weather, as the sides loop up, and the patients like it, in consequence; but when one has seen rheumatic and dysenteric cases out of bed, assisting the orderlies in a desperate effort to prevent their canvas home collapsing, the while streams of water course about their feet, and rain trickles down on them from above, things wear a different aspect. Such was the state of the well-pitched Langman Hospital tents on one or more than one occasion at Pretoria, after it had been incorporated with No. 7.

So greatly did Colonel MacNeece object to them, that he did not rest till he had them wholly replaced.

We have referred to this great ship, which, by the way, is kept as spotlessly clean as a man-of-war; we have considered her crew and the watches kept. It is now the turn of her cargo, a cargo which is ever shifting, and has various destinations.

Let me say at once that a sick Tommy makes the best patient a doctor could desire. For one thing, he is used to discipline, and does as he is told; for another, he is, above all things, a philosopher.

It is wonderful how calmly he will face an operation, if he trusts his surgeon; and his gratitude is often touching, and expressed in letters ungrammatical perhaps, but eloquent in their rudeness.

How he likes a little chaff, and if he is Scotch, his delight at a word or two of the Doric is superb. He takes everything quietly, even death itself, and at times is most amusing. Naturally, there are exceptions. You meet the dour, sulky man; the neurotic mortal, though he is very rare; and every now and then the skrimshanker or malingerer. The last-named is sometimes clumsy, sometimes a very artful dodger. Here is a good story anent one of those gentry. A poor soldier, at a certain hospital in Natal, suffered most severely from prolonged and distressing pains, chronic lumbago, stiffness of the joints, soreness of the muscles. Poor fellow! he was clearly quite unfit for further duty, and was sent down to Durban *en route* for England. There he penned a letter to a kindred soul in the hospital.

> "DEAR BILL (it ran),—Rheumatism's the game. You jist try it on. It's worked the bloomin' oracle with me."

And so it had, though not in the way he supposed. He had forgotten the Censor! That much-maligned man, however, did not forget him; and at Cape Town our poor rheumatic had perforce to disembark, and for all I know is still serving his country, unless indeed he has managed to work the "bloomin' oracle" a second time and in a more efficient manner.

The great difficulty is to satisfy a hungry enteric. Convalescent typhoids have no morals as regards diet, and a convalescent typhoid Tommy has less than none. He craves for solid food, and it is hard to make him understand the reasons for its being withheld, especially if there are other cases in the same ward with him who are living on the fat of the land.

It is not too much to say that his horizon is bounded by minced chicken, and he counts the days till he can get his jaws to work again. If nearly well and treated by the Sisters to a spread of tea and cakes and buns, it is absolutely amazing to observe his gastronomic capacities.

A man in one of my wards, I am proud to say, secured the record on such an occasion with twenty-six cups of tea, and somewhere about eighteen buns and cakes combined. I lay awake all night expecting to be called to see him *in extremis*, but he was not a whit the worse and actually ate his rations with a hearty appetite the next day. He reminded me of the little boy who, while performing a similar feat at a ragged-school feast, triumphantly announced, "I'm no' eatin' for hunger now, I'm just eatin' for fair greed."

"All work and no play makes Jack a dull boy." This is a platitude, and is specially true of hospital life. Amusements, however, were not lacking in Natal.

Riding, football, cricket, hockey, quoits, and golf, all served to while away leisure time. The golf was, to say the least, peculiar, with anthills and dongas as hazards, and special privileges as to altering the surface of the veldt before addressing the ball. At Pretoria the principal difficulties were dead trek oxen, which necessitated wielding the club with one hand while the other tightly grasped the player's nose. It will be apparent that the course was essentially a sporting one. In Natal, "kraaling" and bargaining with Kaffirs constituted welcome diversions, while chaffing a raw recruit at mess was at times a source of merriment. One newcomer, a youthful Civil Surgeon, was gravely informed that in the Bushman River there existed two strange and savage animals—to wit, the crocidator, this being the progeny of the male crocodile and the female alligator; and the allodyl, the loving child of the male alligator and the female crocodile. Long he wandered on the banks seeking those wonders, but needless to say his zoological zeal remained unsatisfied.

In such a ship's company curious members are certain to be present, and of these prominence must be given to the Ghoul, an energetic orderly who had charge of the chapel and the mortuary tents. The doings of the Ghoul would fill many books, and during an illness which separated me from most of my fellow-men I became well acquainted with his peculiarities.

It was his habit to scribble texts or even small verses of his own composition on the plain deal coffins, till the Roman Catholic priest discovered some of his flock being buried with heretical inscriptions upon the coffin lids, and, complaining, had the practice stopped.

At times he hit the mark. I recall a tragic case, that of a young soldier who, early in an attack of enteric fever, had in all probability died as the result of perforation, brought on by the jolting of the train. This the Ghoul was quite incapable of understanding, and yet in the text he chose these words occurred, "Thou tookest away my strength on my journey."

Treading delicately, like Agag, he would enter my isolated tent, situated close to that which served as a mortuary, and he would be accompanied by his familiars—flies with green bodies and brilliant orange-red heads, which used to make me wonder if I were delirious.

With an expansive smile, the Ghoul would seat himself by me, and with a jerk of his thumb announce—

"Fine cold weather for corpuses, sir; I've got two in there"; or, it might be, "Three of them to-day, sir, and one's that 'ere Boer what's so big I can't get him jammed in." Cheerful, was it not, for a sick man? Again he would remark eagerly—

"Just you listen to this, sir; hain't this 'ere a lovely text for 'im?" and he would proceed to mangle a psalm. Finally he would lay a clammy hand on my head, a hand which I had last seen performing some curious offices, and with a smile, intended to be cheerful, would retire, while my temper and temperature, both of which had steadily been rising, would return slowly to the normal.

I am certain he had a fine text for me, but, being happily baulked in that direction, he took to reading me his good wife's letters, which, as they chiefly referred to the multiplication of little ghouls, I regret I am unable to reproduce *in extenso.*

Passing from the partly allegorical to the strictly practical, let us look at a few of the more interesting cases which came under notice in the General Hospital and elsewhere. For the notes on the two following I am indebted to Major J. F. Burke of the R.A.M.C., while the post-mortem examinations were performed by Dr. W. Watkins-Pitchford.

CASE 1.—*A case of multiple intussusception occurring after enteric fever.*—Pte. E. T., æt. 29, admitted April 5, from a field hospital, with no urgent symptoms, and a statement that he was convalescent from enteric fever. He was on solid food, and had been allowed to walk about. He continued to progress favourably till May 24, when he complained of diarrhœa and severe griping pain. He was consequently kept in bed; but the diarrhœa, despite treatment, became severe, and on the following day vomiting and sudden collapse ensued. His temperature fell below normal, his pulse became feeble, and his extremities cold. There were no objective signs of perforation.

A brief account of the progress of the case follows, though the line of treatment is not stated. *May* 26.—Still collapsed; diarrhœa less. *May* 27.—Blood in motions and vomit; emesis severe. *May* 28.—Vomiting and hæmorrhage less; pulse feeble. *May* 29.—No vomiting. He passed about 2 oz. of blood per rectum. No distension. There was acute pain over the cæcum and the sigmoid flexure. He was very restless, and his tongue though furred was moist. A consultation was held as to the advisability of operating, but it was decided to refrain. *May* 30.—Patient had a very bad night, his bowels being very loose and the motions streaked with blood. At 9 A.M. he was very collapsed, with a pulse scarcely perceptible at the wrist, and with sighing respirations. He was accordingly transfused with normal saline solution. Slight improvement resulted, but it was not maintained, and death occurred at 3 P.M.

Post-mortem.—On opening the abdomen, nine intussusceptions were found, several being double. They ranged from a point about 30 in. below the pylorus to about 4 ft. from the upper end of the ileum, the remainder of the small intestine being free. These intussusceptions were about 3 ft. 5 in. apart, and were easily reduced by traction, there being no lymph exudation around them. They were about 2 ft. 4 in. in length. On opening the bowel the lumen was seen to be narrowed in places. About 2 in. from the ileo-cæcal valve several healed ulcers were found. The mucous membrane of the lower 18 in. of the ileum was intensely injected; above this the injection was not so uniform, but occurred in patches, and these patches higher up were limited to the summits of the valvulæ conniventes. Several healed ulcers were found further up the bowel. Portions of healthy gut alternated with patches of extreme congestion. About 5 ft. from the valve there was again marked uniform extreme congestion for a distance of 6 in., followed by normal tracts of gut; this was repeated throughout the rest of the small gut. The upper congested patches corresponded to intussusceptions. The rectum and descending colon showed signs of old colitis, the mucous membrane being roughened and spotted like the posterior portion of the normal tongue. It is probable most of these gut inversions were merely ante-mortem, but I do not know whether there was any pathological evidence to show that such was the case.

CASE 2.—*Case of enteric fever with hæmorrhage, tapeworm, ulceration of Meckel's diverticulum, acute dilatation of the stomach, intussusception, and foreign body in the appendix.*—Pte. J. S., æt. 22, was admitted on June 15, from a field hospital, with a history of having been treated for enteric fever for a period of seven days. On admission, patient was in an acute typhoid condition, dull with flushed face, dry lips covered with crusts, and a dry tongue coated with a thick brown fur. There was considerable emaciation, the abdomen was concave and flaccid, and presented a fairly profuse and typical rash. The spleen was much enlarged. Nothing special is recorded regarding his condition till June 20, when there is a note to the effect that his temperature the previous evening had been 104°·4 F., and that he now complained of pain down the left side of the chest. Otherwise his condition remained much the same, strength being fairly maintained.

June 21.—But little change. Some tenderness in the cæcal region, and below the left costal margin in the nipple line. *June* 23.—Patient had a severe hæmorrhage during the night, and at the same time passed a large tapeworm, the head being present. His morning pulse was 136 and his tongue extremely dry. At 11 A.M. he had another hæmorrhage, but not as large as the former. There was no marked pallor, and his pulse, though very rapid, was of fair tension. Pain was complained of in the left hypogastric region, but there was neither meteorism nor loss of flaccidity. 6 P.M.—Vomiting came on about 3 P.M. There is no note as to the character of the vomited material, but a curiously shaped distension, limited to the left of the middle line in the left hypogastric region, is described. There was marked tenderness and loss of flaccidity over this area. Pulse was quick, thready, and fluttering, subsultus marked and general; there was great tremulousness, and conjunctivæ were injected. The patient died at 3.30 A.M. on June 24.

Post-mortem.—On opening the abdomen, the stomach was found to be dilated and shaped like the letter j. There were numerous small petechiæ on the parietal peritoneum, especially over the gastric region. The pyloric orifice was distended, and the first part of the duodenum much dilated. The lowest portion of the stomach, which corresponded to a point about the junction of the left four-fifths, with the right one-fifth of the greater curvature, was 1½ in. below the level of the umbilicus. The peritoneal cavity was normal, but upon tracing the duodenum its second and third parts were found to be greatly distended. There were several small liver-coloured glands in the upper part of the great omentum, while the spleen was slightly enlarged, and presented at its upper end white fibrous nodules, apparently of the nature of old infarcts. The lymphatic glands of the mesentery were numerous, and enlarged to the size of filberts, and those in relation to the cæcum and the lower part of the ascending colon were also markedly larger than normal. The stomach measured 19½ in. along its greater curvature, and contained about 1 pint of what looked like altered bile. The posterior portion of the mucous membrane was deeply injected. The mucous membrane of the duodenum, for 2 or 3 in. from the pylorus, was marked by numerous injected points, while that of the whole of the stomach and the duodenum was devoid of rugæ. The pancreas was normal. Both duodenum and jejunum contained a large quantity of green bile. An intussusception was found about 10 ft. distant from the duodenum, and another 5 ft. further on, about 6 in. of the gut being invaginated. Two ft. below the ileo-cæcal valve a well-marked Meckel's diverticulum, about 2 in. in length and very capacious, was present. Its mucous membrane presented several deeply excavated enteric ulcers, with no signs of repair. From the diverticulum to the cæcum, ulcers increased both in size and number. From one of these large ragged ulcers the hæmorrhage had taken place, the bowel being filled with altered blood. One of the lips of the ileo-cæcal valve was also eroded by an ulcer, but no ulcers were found in the cæcum. The lumen of the appendix vermiformis was very patent, and its mucous membrane injected. At the distal extremity a large pear-shaped piece of solder was found lying in a clear fluid. The colon and rectum were normal, and no *tæniæ* were discovered in any part of the intestinal canal. The liver was enlarged and fatty, and an infarct occupied the tip of its left lobe. The heart and kidneys were examined and found to be normal.

In addition to the above, I may make brief mention of a case of acute nephritis which came under my care at Pretoria.

Case 3.—The patient was a stout plethoric man, a regimental cook, and had been alcoholic in his habits. On admission he was passing about 30 oz. of smoky, albumin-laden urine in the twenty-four hours, and presented slight anasarca of both legs, dropsy in the flanks, and considerable pulmonary congestion, both bases being affected. He had no cardiac disease. For a couple of days he continued very well, being kept strictly to a milk diet, and his symptoms lessening; but early on the morning of the third day I was called to see him, and found him in a violent uræmic convulsion, his eyes upturned, his face livid and twitching, and his teeth tightly compressed. There had been nothing to lead one to expect so grave a complication. A wet pack was at once ordered, and pilocarpine administered, but without avail, the fits only abating slightly, to again come on with renewed violence.

Eventually, having regard to the man's habit, and noting the turgidity of his superficial vessels, I resolved to venesect, and removed 12 oz. of dark venous blood from his left median cephalic vein. The effect was sudden and remarkable. Before the operation was completed the convulsions had ceased, and the patient was semi-conscious. He made a good recovery; and I may further note that in this case I found gallic acid of value in diminishing the quantity of albumin passed, which was excessively large, and did not yield to dietetic treatment.

As regards the routine treatment of enteric fever I believe the war has taught us little.

Contrary to the experience of most of my fellow-workers, I can confidently state that the use of Burney Yeo's chlorine mixture gave excellent results, and that, quite apart from its merely keeping the atmosphere of the hospital tents fresh and sweet by removing the offensiveness of the stools, it cleaned the tongues and promoted convalescence, nor had I any case treated with it from the first week of the fever which developed complications. This may, in large measure, have been due to the strict milk diet enforced, and the care taken to prevent or remedy curdling; but I fancy that if the remedy had been pushed to its full extent, and I rarely found it disagree, its beneficial effect would have been more apparent to those who regarded it as useless. The value of saline injections in cases of severe hæmorrhage was again and again apparent. Two pints of normal saline was the quantity employed, and on several occasions it certainly appeared to rescue the patient from imminent death. I should think that in the algid stage of severe dysentery it would prove useful, though I have no practical experience in this direction.

One has seen several instances of the very slight protection afforded by one attack. A Civil Surgeon suffered from an extremely severe bout of enteric, being at death's door by reason of repeated hæmorrhages. He eventually, thanks to saline injections, made a good recovery, returned to England, was again sent out to South Africa, and within a few months of his first illness suffered from a second grave attack of undoubted typhoid fever.

In South African dysentery it would seem that, in the early stages, the saline treatment is by far the best, and Dr. Purves Stewart of the Imperial Yeomanry Field Hospital informed me at Pretoria, that, in acute cases, he usually gave 1 drm. sulphate of magnesia for four successive hours in the morning, and repeated the same doses in the evening, combining the first dose on each occasion with 10 grs. sulphate of quinine. He had excellent results from this procedure.

In ordinary catarrhal cases a mixture containing in each dose—izal, 3 minims; chlorodyne, 6 minims to 8 minims; and bismuth subnitrate, 10 grs., and given every two, three, or four hours, according to the severity of the case, was found in No. 7 to answer very well. The izal treatment alone was begun by Dr. Crosland, but the above combination, introduced by Dr. Watkins-Pitchford, proved more useful. I am inclined to attribute the good effects to the chlorodyne and bismuth, but in severe cases I found it worse than useless, as valuable time was lost in giving it a trial. It rarely, however, failed in some measure to relieve pain and tenesmus.

In cases somewhat advanced, ipecacuanha, given in large doses, proved in my experience the remedy to be relied upon, the form without emetine being of course preferred. I saw few chronic ulcerative conditions, and cannot speak as to the value of irrigation. Hepatic abscess, as has frequently been noted, was an infrequent complication.

Dr. Watkins-Pitchford has kindly permitted me to publish some of the statistics he collected, in which work I had the pleasure of assisting him, and I would here place on record the excellent service he rendered by applying the Widal test to every case in any way resembling enteric, and by the care with which he accumulated statistical information regarding typhoid inoculation.

For a period of five months there were—

Admissions.	Recovered.	Still in Hospital.	Died.
1006	791	155	60

	Admitted.	Recovered.	Died.
Inoculated	92	89	3
Uninoculated . . .	551	511	40
Died, Inoculation unknown	...	...	17
Percentage Mortality of those Inoculated .		3·25	
„ „ not „ .		7·2	

	Admitted.	Recovered.	Died.	
Dysentery . .	396	364	11	Percentage mortality, 2·8
Gun-shot wounds	119	91	2	„ „ 1·68

These cannot but be regarded as eminently satisfactory results, even although the number of cases be not sufficient to base any conclusions upon, regarding inoculation.

The sanitary arrangements of the hospital were above criticism, and Colonel MacNeece's method of dealing with the slop waters was both ingenious and interesting. They were removed by low-caste Indian coolies, who conveyed them in galvanised iron tanks, set on wheels, to pits, arranged with exit channels, fitted with sluices, which led to low-lying grass ground near the little Bushman River.

It was, in fact, a kind of aërobic septic tank and irrigation system combined, and acted admirably, there rarely being any odour even in the hottest days. A portable Thresh's disinfector was used for bedding, etc., while all enteric stools, after being covered with strong izal solution, were mixed with sawdust, and cremated in a special crematorium. This process at times gave rise to unpleasant fumes, but, the direction of the prevailing winds having been considered, there was no nuisance produced in any part of the camp, and no one to offend on the wide stretch of bare veldt over which they were dispersed.

Such is a brief account of medical life, a few interesting cases, and experiences gathered in a General Hospital. Very different is one's existence when attached to troops far away from the railway and hospital comforts.

Here is a case in point. In the early part of this year I found myself for a time in medical charge of the garrison at Kaapsche Hoop, a small gold-mining village, situated on a huge and lofty plateau known as the Devil's Kantour, whence is obtained what is probably the finest prospect in South Africa, embracing a bird's-eye view of Barberton and the great Kaap Plain, the distant mountains of Swaziland; the level stretches of Portuguese territory showing as a faint, blue haze beyond the Lebombo Hills, the green Eland Valley, and the towering heights which bound the Lydenburg district on the south.

The duties were sufficiently varied, there being a force of over 400 men—horse, foot, transport, and artillery, six Dutch laagers, a gold-mining village, a gold mine, and outlying farms.

The signal for attack upon the post was three shots, fired in rapid succession. One night in February it seemed as if the long-expected visit of brother Boer was at last an accomplished fact. It was a suitable time for a warlike enterprise, there being what is called in Scotland "a wading moon," and a hazy uncertain light, by which grey rocks and white tents looked ghostly and unreal.

Suddenly a rifle shot rang out from one of the block houses, and ere many minutes were over a second made itself heard from a different direction. The enemy were known to be in the neighbourhood, but the decisive third report was not forthcoming on this occasion. Instead I was roused by the hoof-strokes of a galloping horse, and immediately afterwards an orderly informed me that I was wanted, a sentry of the Royal Scots having blown off two of his fingers. A hard ride of a mile carried me to the little Dutch schoolhouse which served as the hospital, and there a cheerful sight presented itself,—a man with the third and fourth fingers of his left hand badly shattered, and dangling loosely in a basin of antiseptic, a cigarette in his mouth, and the odour of rum exhaling and mingling with the smoke. Two of the Scots, swathed in grey greatcoats, and looking like monks, held each a lighted candle, and blood drops bestrewed the floor, the solitary orderly having applied the tourniquet on the patient's radial.

The latter's greeting was, to say the least, peculiar—

"Ye're frae Auld Reekie, aren't ye, ye deevil?" he demanded.

I hastened to assure him he was correct, hoping thereby to gain his confidence, but he apparently thought only of himself.

"Weel," he said, "dinna tak' off my pinkie!"

He was semi-delirious from shock and the effects of a strong tot of rum which had been given him, while his condition was also partially accounted for by his having the "jumps," which had brought about the accident. He went under chloroform, wailing "Ma pinkie, ma pinkie, ma pinkie!" and I regret to relate that both the "pinkie" and its neighbour are things of the past with him.

So much for one of the few surgical experiences which fell to one's lot, and which was far from pleasant, considering the appliances at hand, the light, and the unskilled assistance.

Still, though it is no doubt pleasant to be within reach of books and laboratories, to be certain of your diet, to experience once more the amenities of civilisation, I think there must be few who have borne a part in this great campaign, to whom at times there does not come a hunger for the veldt. In the flickering fire flames one sees strange visions of khaki and of Kaffirs. Once again one gazes on the yellow veldt grass, rippling in the hot sunshine, and marks the long-tailed Sakaboula bird flitting slowly in undulating flight; one hears the throaty bugle calls, the rumble of ordnance, and the tread of marching men; and from a reverie one is roused by the sudden crack of the trek whip, and the voice of the Zulu driver shouting with all the strength of his leathern lungs, "Tokwaan, weet, weet!"

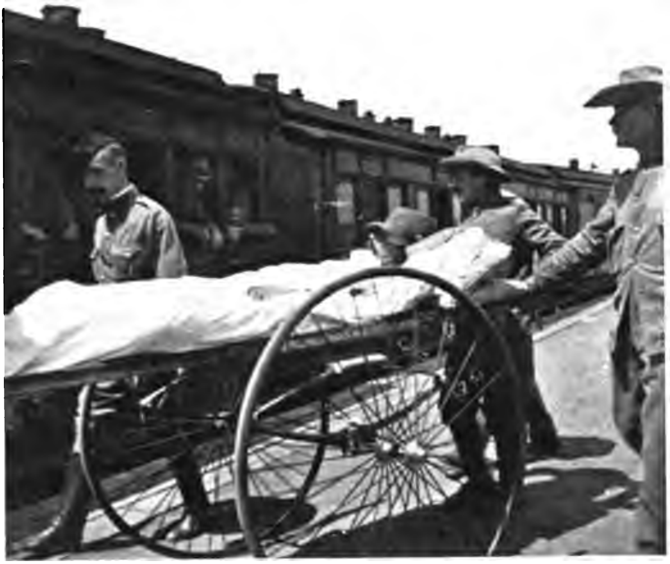

Fig. 1.

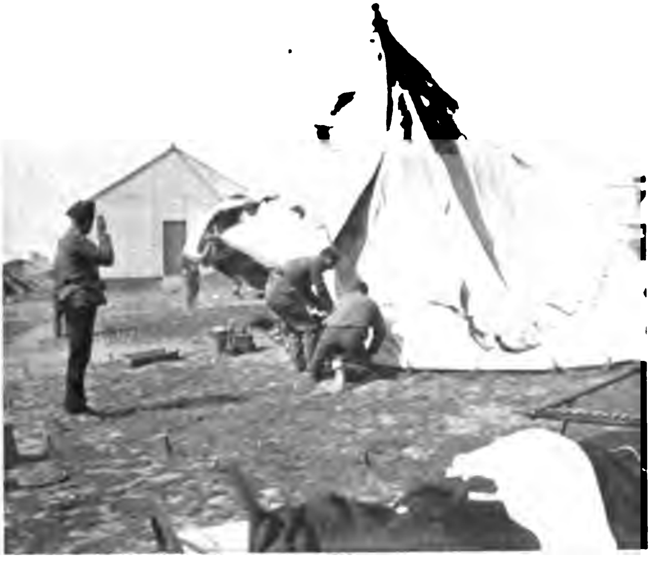

Fig. 2.

REDUPLICATION OF THE SECOND SOUND OF THE HEART.

By C. C. Gibbes, M.D., M.R.C.P., *Physician and Pathologist to the Hospital for Diseases of the Heart.*

In spite of the frequency with which the second sound is reduplicated, we find that many authorities differ, not only as regards the cause of the reduplication, but also on several points connected with its character, composition, and conduction. In the first place, it may be asked, What is meant by reduplication of the second sound?

I recently examined a case of mitral stenosis, that was shown as an illustration of the reduplication of the second sound at the apex, there being none at the base. On examination, I found that the two sounds were separated by a distinct interval at the apex, while at the base, although no interval existed, the two sounds could be plainly heard side by side, the exhibitor of the case evidently considering that it was not sufficient for the component parts of the second sound to be audibly asynchronous, but that there must be an interval between them before reduplication could be said to be present. I cannot, however, accept this interpretation, for I consider that reduplication of the second sound is present when the aortic and pulmonic portions of it are sufficiently asynchronous to permit of both being heard, the presence of an interval being an accident, not a necessity, and depending on the amount of asynchronism present, the distance the sound waves have had to travel from their point of origin, and the conductivity of the material through which they have travelled; the two latter conditions causing the aortic and pulmonary portions of the second sound to be heard side by side over their seat of origin, but separated by an interval at the apex, where the sound waves have had greater amplitude.

Various theories have been advanced with regard to the cause of the reduplication, but most authorities now agree that it is due to asynchronism of the aortic and pulmonary portions of the second sound; the explanation being that when the tension is abnormally high in the pulmonary artery, as in mitral stenosis, "the right ventricle is, by reason of the increased blood pressure in the right cavities of the heart, first stimulated to contract, yet, in consequence of the obstruction to the passage of blood through the lungs, and the difficulty which the ventricle has in emptying itself, its systole is so prolonged that a sufficient amount of asynchronism is produced to allow of an appreciable interval between the aortic and pulmonary sounds."[1] This presupposes that the pulmonic sound forms the second portion of the reduplication Other authorities, who also believe in this relative position of the two second sounds, hold that the ventricular systoles commence together, but the tension in the pulmonary artery causes the systole of the right ventricle to be prolonged before that of the left ventricle. My own opinion is, that the side of the heart which has to cope with the greatest amount of abnormal intra-arterial pressure takes the longest time in getting up steam, to overcome the said pressure and open the semilunar valves; it therefore begins its contraction before the other ventricle. The closure of the semilunar valves takes place, under normal conditions, at the moment when the intra-arterial pressure rises to a point higher than the intraventricular pressure. If, therefore, any alteration occurs in the relative aortic and pulmonic pressure, which is as three to one, those valves would close first on the side where the arterial pressure was in excess of this normal ratio. In my present paper I intend dealing only with those cases in which the pulmonic pressure is abnormally high.

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[1] Bramwell, "Diseases of the Heart," p. 164.

Among the more recent writers who are opposed to the generally accepted views, we have Balfour, Sansom, Cheadle, and Boyd. Balfour[1] holds that reduplication may take place in either the aorta or pulmonary artery; the first of the two second sounds being "the snapping together of the valve segments at the close of the cardiac systole"; the second part being produced by "the arterial systolic closure of the valve," meaning, I presume, the tension of the valves and their respective blood vessels. He bases his theory on Ceradini's view, that "the valve segments fall together with an audible snap." This, however, is opposed to that which is now generally held, namely, that the closure of the semilunar valves is "effected gently, and will lead to no noise."[2] He also makes two statements in support of his theory with which I am unable to agree, namely, that the absence of pulmonary accentuation is conspicuous in cases of reduplicated second sound, and that reduplication is present when there are only one set of valves to produce it, as in free aortic regurgitation.

Sansom holds that it is not a true doubling of the second sound, but it is of mitral origin. "The first element of the double shock sound is the normal second sound, often accentuated as to its pulmonary artery component; the second element is a sound of tension produced by the forcible entry of blood into the ventricle, the shock being communicated either to the wall of the ventricle or to the anterior curtain of the mitral valve close to the aortic cusps."[3] This refers more especially to mitral stenosis, but he also attributes any reduplication of the second sound, whether heard at the base or apex, to the same cause. Cheadle[1] and Boyd[2] agree in the main with Sansom, the former quoting it as an early sign of endocarditis in children, and suggesting that the reduplication of mitral stenosis "is probably due to retarded opening of the mitral gate, resulting from rigidity caused by inflammatory thickening." There are also differences of opinion among those who hold that reduplication is due to asynchronism as to the relative position of the aortic and pulmonary second sounds. Among others, Bristowe,[3] Broadbent,[4] Acland,[5] Coupland,[6] have given it as their opinion that the second aortic sound lags behind; while Hayden,[7] Byrom Bramwell,[8] Barr,[9] Sibson,[10] Gibson,[11] maintain that the pulmonary forms the second portion. Much difference of opinion also exists concerning spurious reduplication of the second sound. Some authorities, as I have already shown, believing that all reduplications ought to be placed under this heading, it may be as well, therefore, to state that I only apply the term to interpolated sounds, exocardial in origin, that are heard during the middle third of the diastole.

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[1] "Diseases of the Heart," p. 35.

[2] "Text-Book of Physiology," edited by Schäfer, vol. ii. p. 37.

[3] Allbutt's "System of Medicine," vol. v. p. 1020.

In my present inquiry on these disputed points, I have especially noted the following particulars in all cases of reduplicated second sound that have come under my notice:—(1) The area over which the reduplicated sounds are heard; (2) the relative intensity of the two sounds in the different cardiac areas; (3) the point of maximum intensity of the first and second portions of the reduplication; (4) the relation the reduplicated sounds bear to aortic and mitral diastolic murmurs.

1. *The area over which the reduplicated sounds are heard.*—There are various circumstances that influence the conduction of the reduplicated second sounds, the principal ones being—(*a*) the intensity of its component parts; (*b*) the nature of the media through which the sounds are conducted; (*c*) the posture of the patient at the time of the examination.

(*a*) Primarily, of course, the area depends on the intensity of both the pulmonary and aortic portions of the second sounds, but in reality it is almost entirely dependent on the conduction of the second or aortic portion, the accentuated second pulmonary sound being always plainly heard over a wide area. This opinion is directly opposed to Ewart's,[12] who holds that the second pulmonary sound has a limited area, and that the second aortic is widely conducted by reason of the anatomical relations of the aortic valves. I think, however, he underrates the conduction of the pulmonary second sound by the walls of the chest; for, owing to the close proximity of the valves to the chest wall, the pulmonary second sound is widely conducted by this means alone, whereas the position of the aortic valves prevents a similar conduction of the aortic portion; the chest wall having little or nothing to do with the presence of the second sound either in the aortic area or at the apex. The result of this difference in the conduction of the second sounds is, that in a very large majority of cases the reduplication is only heard over the heart and large vessels, the aortic second sound becoming lost as we get further afield; when, on the contrary, the aortic sound as well as the pulmonary is increased in intensity, the reduplication may be heard over a far wider area.

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[1] Allbutt's "System of Medicine," vol. iii. p. 43.
[2] Boyd, *Lancet*, London, 1896, vol. ii. p. 1685.
[3] *Proc. Med. Soc. London*, vol. xi. p. 46.
[4] "Diseases of the Heart," p. 46.
[5] *Lancet*, London, 1889, vol. ii. p. 104.
[6] *Clin. Journ.*, London, 1894, p. 325.
[7] "Diseases of the Heart and Aorta," p. 128.
[8] *Loc. cit.*
[9] *Liverpool Med.-Chir. Journ.*, 1882, p. 193.
[10] Reynolds' "System of Medicine," vol. iv. p. 488.
[11] *Birmingham Med. Rev.*, vol. xxx.
[12] *Lancet*, London, 1894, vol. ii. p. 789.

Reduplication is more frequently heard over the base alone than over both the base and the apex, the point of maximum intensity being in the pulmonary area; if, however, the aortic second sound is feeble, or the apex of the heart is displaced to the left, the reduplication may be inaudible in the pulmonary area, but become manifest as we approach the aortic area; in other cases it may be only heard over the sternum at the level of the third intercostal space. When it is heard at both base and apex, the sounds present somewhat different characters in the two situations. As they are followed downwards from the pulmonary area, the interval between them becomes wider as we approach the apex, in consequence of the increasing amplitude of the sound waves; for although the second sounds are side by side at the base, yet there may be a distinct interval between them in the mitral area. At the same time the intensity of the sounds, more especially the pulmonary, diminishes the further we get from their point of origin.

I find this is the rule in young anæmic patients, in early cases of mitral stenosis and in pulmonary diseases. The exceptions that occur will be mentioned when dealing with the second portion of the reduplication.

(*b*) The conduction of the reduplicated sounds to the chest wall may be interfered with by extrinsic or intrinsic causes; the former need only be referred to. One of the latter causes, however, has an especial bearing on the present question, namely, the displacement backwards of the aortic valves by the engorged right ventricle in mitral stenosis. Under these circumstances, the second or aortic portion, already enfeebled by the diminished left ventricle output, may be more readily conducted to the apex than the base by the walls of the left ventricle, the consequence of this being that the reduplication is only heard in the latter situation. Several authorities consider this a common occurrence, but that is not my experience, as I find it is very far from common, and only heard when compensation is failing.

(*c*) The area over which the reduplicated sounds are heard is greatly influenced by the position of the patient. As a rule, they are heard over a much wider area in the recumbent than in the erect posture, for the reduplication may be entirely absent, or only heard over a small area at the base, while the patient is standing, and yet well marked at both base and apex when the recumbent posture is assumed. Exceptionally, the rule is reversed, and the reduplication is louder in the erect than in the recumbent posture. I have found this occur in cases of general arterial sclerosis with or without kidney disease, and in adherent pericardium.

2. *The relative intensities of the two second sounds.*—Excessive rapidity of the heart's action, and absence of an interval between the two sounds, render any comparison of their relative intensities impossible, but so many opportunities present themselves for making accurate observations that no doubt should exist on this point. Personally, I find that the accentuation is on the first portion of the reduplication, over the whole of the præcordial region, being especially marked in the pulmonary area. If the tension is abnormally high in the general arterial system, as well as the pulmonary, both sounds are sharper than normal, but the accentuation is still on the first portion. On comparing the reduplicated sounds in the aortic and pulmonary areas, I find that the first portion of the reduplication is less intense in the aortic than in the pulmonary area, whereas the intensity of the second portion is increased. At the apex the same relative intensities occur, except in the instances that will be referred to subsequently.

3. *Point of maximum intensity of the first and second portions of the reduplication.*—In the large majority of cases the pulmonary or first portion of the reduplication has its point 'of maximum intensity in the pulmonary area; occasionally it is best heard over the sternum about the level of the third intercostal space; while in other instances it appears to be heard with almost equal intensity on either side of the sternum. This is due, I believe, to lateral displacement of the apex of the heart, which causes the semilunar valves to have abnormal surface relations, and thereby alters the areas to which the second sounds are usually conducted.

The normal aortic and pulmonary second sounds are, as we know, best heard in the so-called aortic and pulmonary areas, certain influences, which need not be detailed, combining to effect this conduction to the surface of the chest. But we are apt to forget that the semilunar valves are not fixed points, and that their surface relations alter even under perfectly normal conditions. When, therefore, the apex of the heart is displaced to the left by hypertrophy and dilatation of the right ventricle, the pulmonary valves are displaced to the right, and are situated under the sternum, with the result that the second pulmonary sound is heard to the right of the usual position. Lees,[1] in a recent article on acute dilatation of the heart, calls attention to "accentuation of the second pulmonary sound," and "marked accentuation of the second aortic," as special features of that disease. In Cases 8–12 of those recorded by him, he mentions the area of cardiac dulness, and in all it extends considerably to the left of its normal position, the limit varying from one to three fingers-breadth to the left of the nipple line. There can be no doubt as to his clinical facts, but I think there is with regard to his deductions, for I cannot believe that every accentuated second sound heard in the aortic area must of necessity mean accentuation of the second aortic sound. In chronic dilatation of the heart, with displacement of the apex to the left, the same accentuation occurs, and we frequently have an accentuated second sound on both sides of the sternum about the level of the third intercostal space, owing to the second pulmonary sound being abnormally conducted to the surface of the chest.

For the same reason, it is sometimes difficult to determine where the point of maximum intensity of the second aortic sound really is, and where a pure aortic second sound can be heard. I recently made a post-mortem examination that has a special bearing on this point:—

Case 1.—Male, æt. 44; fourteen days before his death he presented the following physical signs:—The heart considerably enlarged, the apex beat in the seventh space, anterior axillary line. A double aortic murmur was heard all over the base, the regurgitant portion being conducted to the apex. In the aortic area it followed an accentuated second sound, but over the lower portion of the right carotid artery no second sound could be heard at all, the murmur being heard as a faint blur. At the apex a loud mitral systolic murmur was present, which was conducted to the sternum and angle of the left scapula. On post-mortem examination the aortic semilunar valves were found to be very much shrunken and incapable of any tension, and although they might have offered some slight resistance to the regurgitant current, they could not have caused sufficient tension in the aorta to have produced any audible second sound, certainly not an accentuated one; therefore the accentuated second sound must of necessity have been the second pulmonary.

When reduplication is present, it is this occurrence of accentuation of the first portion in the aortic area that has led to some of the differences of opinion that at present exist. When reduplication is present in cases of anæmic or early mitral stenosis, both sounds are, as I have stated, less intense at the apex than at the base. This is the rule in a very large majority of instances, but I find that, under certain conditions, exceptions may occur.

(*a*) The reduplication may be more plainly heard to the left of the apex beat than over the right ventricle, in consequence of the second or aortic portion being conducted to that portion of the chest by the walls of the left ventricle. I have observed this in young anæmic patients, and in a few cases of mitral stenosis. The following case, which I have had under observation for the past four years, will explain my meaning:—

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[1] *Brit. Med. Journ.*, London, 1901, vol. i.

CASE 2.—Male, æt. 40, had acute rheumatism in July 1891; he is now suffering from pure mitral stenosis, and presents the usual physical signs. On one or two occasions the compensation has slightly failed, but it is at present perfectly effective. The reduplicated sound can be plainly heard, separated by an interval in both the pulmonary and aortic areas, the accentuation being on the first portion in both these situations. The point of maximum intensity of the first portion is in the pulmonary area, that of the second portion in the aortic area; both the reduplicated sounds are heard right down to the apex beat, and gradually decrease in intensity from above downwards; but when we get to the left of the apex beat, the second portion of the reduplication greatly increases in intensity, and is almost as loud as in the aortic area.

The abrupt increase in intensity immediately to the left of the apex beat was very marked, and due, I believe, to the conduction of the second or aortic portion to the surface of the chest by the wall of the left ventricle, clearly proving, I think, that the displacement backwards of the aortic valves, by the engorged right heart, may alter the normal conduction of the aortic portions of the second sound. In the later stage of mitral stenosis, when compensation is failing, we lose the reduplication to the left of the apex, in consequence of the failure of the second aortic sound to reach the chest wall, the pulmonary second sound being alone heard. Should failure advance still further, and the pulmonary second sound become enfeebled through tricuspid regurgitation, it may also be lost, with the result that no second sound is heard at the apex.

(*b*) Another exception to the usual conduction of the sounds is sometimes found in cases of mitral stenosis, where there is a regurgitant as well as a presystolic murmur, where the nature of the apex beat leads us to suppose that the left ventricle is hypertrophied, and where there is slight, if any, loss of compensation. Under these circumstances we occasionally hear a decided augmentation of the second portion of reduplication as we approach the apex. A quotation from my notes on one of these cases will explain my meaning. "The second sound is reduplicated in the pulmonary and aortic area with a distinct interval between the two second sounds. The accentuation is on the first portion of the reduplication in the pulmonary area. The point of maximum intensity of the second portion is uncertain. On listening down the left side of the sternum, the intensity of the sound remains the same until the fifth costal cartilage is reached. From this point to the apex beat (which was two fingers-breadth to the left of the mid-clavicular line in the fifth space), the second portion of the reduplication seems to become reinforced, is of lower pitch, longer, and of greater intensity." These cases are far more common, and I have only observed this reinforcement when the heart has been in the condition above stated. My explanation is, that it is the result of the muscle vibrations produced by the active diastole of the hypertrophied left ventricle; this diastole not being a mere passive process but an active muscular one, which creates sufficient suction power to materially assist the inflow of blood through the stenosed mitral orifice. The aortic second sound being thus augmented by muscle vibrations, assumes the character of the normal first sound, of which muscle vibrations form a component part.

4. *The relation borne by the reduplicated sounds to aortic and mitral diastolic murmurs.*—When an aortic diastolic murmur is associated with reduplication of the second sound, the murmur always follows the second or aortic portion. In mitral stenosis with an early diastolic murmur, the same thing occurs; if reduplication is absent, the murmur accompanies the second sound, and is called an early diastolic murmur; should reduplication be present, it follows the second or aortic portion of the reduplication, and is called a mid-diastolic murmur, the distance between the murmur and the pulmonary portion of the second sound depending on the amount of asynchronism present. In some cases where the aortic portion of the second sound is very feeble, the murmur may drown it and appear to entirely replace it, the murmur being separated from the pulmonary second sound by a distinct interval.

In conclusion, I would call attention to the following points that have a special bearing on the relative position of the pulmonary and aortic second sounds:—

1. The point of maximum intensity of the first portion is, as a rule, in the pulmonary area.
2. The intensity of the second portion is greater in the aortic than in the pulmonary area.
3. The increased intensity of the second portion to the left of the apex in the cases referred to by me.

CLINICAL RECORDS.

CASE OF BRONCHITIS WITH LOBAR PNEUMONIA IN A CHILD SIX YEARS OLD.

By Hugh Logan Calder, M.D., *Leith*.

Lobular pneumonia occurring in the course of a bronchitis is fairly common, but a distinct lobar pneumonia is of much less frequent occurrence, though by no means so infrequent as might be inferred from the scant notice it receives in most of the text-books. In my own practice, within the last six months I have met with three cases more or less well marked, and all exhibiting one distinguishing characteristic, viz. failure of the right ventricle. The latest case, occurring in a boy æt. 6, was the most characteristic of the three:—

Case.—The patient had had two previous attacks of bronchitis, and in this instance had been ill for eight days before medical aid was called in. On examination, there was bronchitis, mostly of the medium tubes, moist sounds being heard all over both lungs. The temperature was 103° F.; but there was a good deal of dyspnœa, and the patient had a look of considerable distress. On the following morning there were distinct symptoms of pneumonia and pleurisy of the right lung behind, with an increase of all the symptoms. The febrile condition was more marked, and there was also some albuminuria. Until the fourth day of pneumonia, the case followed a fairly normal course. At that time, however, although the pulse at the wrist was good—indeed, very good—the patient was considerably cyanosed, and the dyspnœa and general distress had increased. There was also some diarrhœa, and, most alarming symptom of all, the cardiac dulness was most marked, and all the indications were of failing right heart.

Up till this time only an ordinary expectorant mixture had been prescribed, with poultices to the chest for the pleuritic pain. But the patient was now in a very serious condition, and prompt action was necessary if it were to be of any avail. It was a case in which bleeding might have been resorted to with success; but for one reason or another that method of treatment has lately fallen somewhat into abeyance, and I was not prepared for it at the moment. Accordingly, in order to provide a stimulus, recourse was had to a mustard bath, with decidedly good effect. Some cups were also applied to both lungs behind. Digitalis in large doses was administered, and alternated with drachm doses of syr. acidi hydriodici. Later the digitalis was replaced by tr. strophanth. in small doses. As there was albuminuria, alcohol was withheld. Very soon improvement set in, and the crisis took place on the sixth day of the pneumonia, the condition now being one of bronchitis accompanied by nephritis. Whether the kidney condition was due to toxic infection, or was simply a coincidence, I am not prepared to say; but it disappeared pretty rapidly after the pneumonic crisis.

In reference to the above, it may be noted that the pulmonary dulness was not due to a sudden collapse of the lung, as in that event the febrile condition of the patient would not have increased, but very possibly would have diminished. But the main point in all three cases was the tendency to failure of the right side of the heart, most pronounced, however, in the case described. As already said, when this condition is present, the state of the patient is very grave, and recourse must be had to strong measures. The ordinary doses of digitalis are insufficient. Twice or even thrice the usual quantity may be administered, and repeated three times at intervals of two hours. The digitalis should then be stopped and replaced by small doses of strophanthus or caffeine every three or four hours. But just as important as the digitalis is the iodide of potash, for its influence on the peripheral circulation. These two, in combination with the external remedies above indicated, seemed to me fully to meet the emergency.

One more point requires notice. If it be the case, as I think it is, that lobar pneumonia in children, occurring during a bronchitis, is prone to become dangerous from cardiac failure of the right side, the indication is to begin a cardiac tonic on the earliest recognition of the pneumonia. I, at least, should be very much inclined to adopt this course, in order, if possible, to prevent the development of cyanosis and the other dangerous symptoms likely to supervene.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

The Struggle for Success: a Study in Social Compromise, Expediency, and Adaptability. By ARCHIBALD STODART WALKER. London: Grant Richards. 1900.

THE spelling of the magic word Success varies widely, according to the fancy of the speller: to Dr. Stodart Walker it seems to mean self-realisation as an effective "social person." We say "seems to mean," for the author is avowedly an apologist for eclecticism, and it is always hard to tell what cards an eclectic keeps up his intellectual sleeve. But the author is explicit in saying that he writes "for the aspirant, who, while taking an active interest in his own personal strivings, is anxious to retain an active participation in social affairs."

Self-renunciation is not success—it borders on suicide; nor is self-differentiation success, if it imply a denial of social birth-rights and birth-duties. Even a mastery of the "Encyclopædia Britannica" (we do not mean the now almost compulsory possession of it) may avail little, if it be unaccompanied by charity, in the old sense. Here Dr. Stodart Walker is at one with the Apostle Paul in his advice to the Corinthians. In other words, he looks for success in the maintenance of egoism, modified by the compromises of altruism; and his most general prescription to the aspirant is to secure "a sound body, a sane mind, and a sense of perspective." This he calls a "trilogy," but its third item might fairly be included in the second, so that we come back once more to the old-fashioned text, *Mens sana in corpore sano.* We hasten to say, however, that there is little that is old-fashioned in the author's sermon—unless it be its length.

The first chapter of the book deals with *physical sanity.* It ought to be very interesting to the physician; it condescends to detailed prescriptions, such as the use of the skipping-rope in wet weather, and therefore provokes concrete criticism. To the aspirant it gives no fewer than seven criteria whereby to determine if his doctor is one of the right sort, which seems to us almost painfully quaint. What is more to the point, it seriously discusses the problem of raising the standard of healthfulness, which comes home to all right-thinking folk.

Most of us will agree with Dr. Stodart Walker in making physical sanity the first condition of success, and the chapter is simply crammed with good advice, including the approbation of the skipping-rope and the disapprobation of the habit of lighting and turning down bedroom gas-jets early in the evening. It is easy to be superior and to call the good advice obvious, but nothing can be too obvious for a superior audience to ignore.

According to the author, the six essential requisites for the noble art of self-preservation are—(1) a knowledge of the primary laws of physiology; (2) skill in methods of self-defence and methods of food-supply: fencing, boxing, shooting, running, climbing; (3) knowledge of climate changes, tides, winds, etc.; (4) knowledge of the habits and habitats of animals; (5) knowledge of the language, habits, and habitats of other races; (6) knowledge of the essential principles of epidemics and infection. This reads like a "Science and Art" syllabus, or like an analysis of common-sense, but perhaps it is wiser than some prescriptions which are more concise and less ambitious. The details given under each head seem to us redolent of common-sense, though many of the suggestions are more practicable (as the preface confesses) for the aspirant of the minority than for the righteously discontented majority. We venture to affirm this even in regard to such a rudimentary habit as "washing the whole body once a day."

It was Heine—a strong genius with a sickly body—who said that man's first duty was to be healthy; and it was he also, with his sad smile, who advised a man to exercise great care in the selection of his parents. These were two wise utterances, if we may say so, for the first recognised that the criterion of healthfulness, rigorously applied, tends to coincide with the plumb-line of good conduct; while the second recognised the perennial difficulty, that a man is born with the living hand of the past upon him, and must always dree his hereditary weird.

Such matters the author considers; and we must all agree with him, that healthfulness is the first rung on the ladder of success. Perhaps, however, we do not all agree that "every sane person watches with care the contents and workings of his stomach," or would prefer to postpone this depressing duty until we become insane, and aware that we have a stomach at all! In fact, the term healthfulness must be used in a large and also in a relative sense. Do we not know men who are virile as bulls of Bashan, whose presence is nevertheless a blot on the emotional landscape? do we not know men who go ailing on crutches, whose presence is nevertheless like the fragrance of sweet-briar in the early summer? Something more than bodily health is needed, and that brings us to the second chapter.

The key-word of this chapter on "Mental Sanity" is *Inhibition*, and as we read it, and thereby revived reminiscences of one of Dr. Clouston's addresses, we felt, as in the previous chapter, both the earnestness and the insight of the author. Yet there is not a little to disturb our satisfaction with his good discourse. "If by careful intellectual training of the nature we have been attempting to indicate," the aspirant "can place himself, his intellectualisation, and his feelings under inhibitory control, he will be able to modify his tendency to egotism in a brilliant fashion, and understand the right reservation which social custom demands. Most of the disturbances of life spring not from carefully inhibited intellectual thoughts, but from ideas which are based on prejudiced and ill-constructed non-inhibited mentality." Between "intellectual training" and "intellectualisation," "intellectual thoughts" and "mentality," the plain dweller in tents gets a little bamboozled, searching for a depth of meaning which is not there.

And is not the emphasis on inhibition overdone? Are not too many of our fellows painfully over-inhibited, to the verge of mental paralysis? Do we not want more men who will let themselves go oftener, who will occasionally reveal some little fraction of themselves outside their hermit shell, who will not talk for ever from the teeth outwards, who will show some spark of originality, even if it has to be labelled fanaticism? This talk of mental inhibition is apt to become wearisome amid a race like ours, in which cerebral variability, eccentricity, individuality are so persistently subjected to snubs, that self-repression has become a habitual "life-harming heaviness." The inhibitory mechanism is essential, but its value depends not a little on the nature of the whole machine. The go-cart of our boyhood could stop in a quarter of its own length, but we were right in longing for a motor (not then invented) which *could* run away.

Throughout the volume we have found sentences that surprise us by their recklessness, and there is an illustration at the end of this chapter on inhibition. "If Robespierre had known anything of science, he would have hesitated before asserting that the immortal compact between God and man was to remove all oppression,—that is, if he had understood that oppression of the weak by the strong was one of the factors in that universal law of nature—the survival of the fittest." Now, while it seems to be a well-substantiated historical fact that, in the course of a complex and manifold struggle for existence, there has been a survival of those organisms which were relatively better adapted than their neighbours to given conditions, how to screw out of this an apology for the *oppression* of man by man, which Robespierre verbally deplored, passes our comprehension.

We pass over the chapter on religious belief, in which, if we understand him, the author advocates an eclectic creed—saved from insipidity by having its items individually selected, like pickles; and we pass over the chapter on morals, in which the modern moral laws, including the primary postulate "Thou shalt not be found out," are compared with the Ten Commandments, to the disadvantage of both. Then follows a chapter on social conventions, from pronunciation to dress, treated seriously, yet with a sparkle of humour, lacking, however, that historical setting in which alone these unwritten laws can be adequately appreciated.

The chapter on law and politics will be apt to suffer from the attractive subject of the next, which treats of marriage. After a brief historical sketch, which might have been based on stronger authorities than Nisbet and Letourneau, the author discusses ten causes of celibacy and other interesting questions; but his most effective words are perhaps those that deal with the importance of educating social opinion and the sense of social duty, so that the marriage of obvious incapables should become abhorrent. We may note that the imaginary sketch of the consequences of a marriage between a thoroughbred Vere de Vere and Miss Gubbins, the millionairess, is not quite in accordance with the little we securely know in regard to the facts of inheritance, and certainly not with "Galton's Law." But this chapter should be both popular and useful.

The ninth chapter contains a sensible argument for the more scientific choice of an occupation—one for which the organism is by nature and nurture well adapted, and in which activity will bring the happiness of natural function. And with this must be conjoined a not less careful choice of environment—wherever choice is possible—a search for "the place which will procure for the organism its greatest output." In both connections, as the author well shows, much may be done to lessen the hereditary handicap.

In the eleventh chapter the author discusses failure and death. It seems a pity to bracket them, but both are inevitable, for all success is relative. Defects in physical constitution or in the mental balance of moods, uncontrolled egoism or exaggerated altruism, may account for the failure, and often the individual has to lament the mortgages which his parents negotiated. But sometimes the period of ineffectiveness begins early, without very obvious reason—the aspirant has got out of touch with his time, he has fallen out of line in the march, he has become stale and dull; and not merely the younger generation, but his compeers, no longer know Joseph. We can only say that he fails for lack of "cerebral variability."

An interesting essay, following Metchnikoff, might have been written on the biology of growing old, and prescriptions bearing on the art of dying gracefully would have made a welcome conclusion to the volume. It seems to us that the author should have said either more or (still better) less about personal immortality; but what he says is frank enough.

To sum up: The aspirant for success "will find in his own physical sanity the sure basis of mental and moral sanctity (*sic*), and for his own highest development he will seek out those methods of work, and those aspects of thought, which will ensure his greatest development and most efficient success. . . . Science will teach him that three golden rules of life are—Concentration on fact, hesitancy in judgment, and rapidity in action—a trilogy which will bring him into the higher plane of social morality. . . ." He must seek to live in "the free eclectic air," not compromising in belief, for that is "impossible to a serious and honest thinker," but compromising in action, for this is necessary as an expedient to secure social efficiency, as things at present are.

There are two abstractions in Dr. Stodart Walker's book which do not commend themselves to us; but, as the preface indicates, they are deliberate. The first is, that he abstracts a particular class of aspirants from the mass of society, and that many of his prescriptions, while ideally possible for all, are impracticable for the great majority. In short, he takes too little heed of the average man of the so-called middle classes, on whom, we believe, the strength of our social organisation largely depends. The second abstraction is, that he discusses the individual struggle of the social person without adequately relating this to the intra-societary struggle between different class-organisations, or the inter-societary struggle between our British organisation and others. We think that the author would have written a bigger book—which need not have been so long—if he had made neither of these abstractions; but his limitation of inquiry, being deliberate, may have a reasonableness which we do not perceive.

There is often in a company one who puts into words what perhaps half the others were more or less vaguely thinking. In so speaking he may confer a benefit, if his clear words serve as the centres round which thought crystallises, and grows larger and fairer. That is true eloquence. But the spokesman may also bring boredom by uttering what is too obvious to be interesting, or by tackling matters too high for him, so that his words function only as the dust particles round which intellectual fog gathers. But if for fear of thus darkening counsel every one kept silence, it would be a dull company and a dreary world. We think that the analogy suggests the reasonable attitude to a volume like that now before us. When a man in one book raises all the big problems suggested by the words health and control, religion and morals, conventions and politics, occupation and environment, education and culture, marriage and death, it cannot but be that his reach will exceed his grasp. There are sure to be some subjects round which his fingers do not meet. Not even omniscience will save him, for he may still be prosy. We have no doubt, therefore, that if almost any one goes to Dr. Stodart Walker's volume, and hunts with keen scent (which the absence of an index will not baffle) for the passages dealing with his pet subject, he will find mistakes, platitudes, extravagant statements, and superficialities. How could it be otherwise? On the other hand, when we pay this volume the compliment it deserves of a careful reading, we find that it is rich in the salt of common-sense, abounding in sound advice, often both witty and wise, and at times truly eloquent. We could indeed conceive of some one using it as the ingenuous youth once employed Todd's "Student's Manual" and such like works, and becoming a social failure of the most provoking type; but an author cannot be expected to provide his readers with a sense of humour. J. ARTHUR THOMSON.

Text-Book of Physiology. By W. H. HOWELL, M.D., Professor of Physiology in the Johns Hopkins University, Baltimore. Second Edition, Vol. i. Philadelphia: W. B. Saunders & Co. 1900.

THE second edition of the American text-book is appearing in two volumes instead of the original one, and this has been undoubtedly a distinct improvement, as in the older form it was too unwieldy. The first volume takes up "Circulation," "Secretion," "Digestion," "Respiration," "Animal Heat," and the "Chemistry of the Animal Body," while the second volume will include "Muscle and Nerve Physiology," "Central Nervous System," "Special Senses," "Reproduction," etc.

The chapters are written by those American physiologists who have specially worked at the respective departments, and the result of their collaboration is very satisfactory, as shown by the remarkable way in which each writer has brought his part up to date. Some of the chapters are especially good—Curtis and Porter on the "Circulation," Howell on "Secretion and Movements of Alimentary Canal," standing out even among the other excellent articles.

It is impossible at the present day to give anything like a complete account of any department in physiology, and the writers have had to limit themselves to what is mainly essential. It would have been better probably had the account of renal secretion been somewhat amplified. Dreser's work ought to have been discussed, owing to its great importance. The histological changes which are supposed to take place in the cells of the convoluted tubules are so extremely doubtful that it might have been better not to describe them. The work, however, can be strongly recommended, not only on account of its reliability, but also for the extremely interesting way in which each subject is discussed.

T. H. Milroy.

Normal Histology. By Edward K. Dunham, M.D., Professor of General Pathology, etc., Bellevue Hospital Medical College, New York. Second Edition. London: Rebman Limited. 1900.

A considerable number of excellent text-books on this subject has appeared recently, and this book presents very few new features. It is well arranged and has been brought well up to date, most of the figures in the text being taken from the best known modern works. In fact, the individuality of the book is partly lost for this very reason, although in many cases it is to the reader's advantage that the figures have been extracted from the best sources. Thus, for example, the author gives Michaelis' figures of the changes in the mammary gland during lactation, Kohn's figures of the parathyroids, etc.

There can be no doubt that the author has taken great care in selecting and arranging his material, with the result that his book may be used as a reliable one in normal histology. Here and there the descriptions are too meagre, as for example those dealing with the auditory apparatus. At the end of the book there is a short account of methods employed in histological work, which is characterised by its simple and yet thoroughly practical character.

T. H. Milroy.

A Clinical Treatise on Fractures. By William Barton Hopkins, M.D., Surgeon to the Pennsylvania Hospital, etc. Philadelphia: J. B. Lippincott Company. 1901.

Of the *making* of books on fractures there is verily no end. We learn from the preface of the work before us that it has been made—we use the word advisedly—from a series "of unpublished clinical lectures, delivered by the author at the Pennsylvania Hospital, so revised and elaborated as to eliminate the elements of incompleteness of clinical delivery and lack of method, necessarily incident to utilising clinical material."

This process of elimination has resulted in the disappearance of all that is essentially clinical in the style and arrangement of the material, and the work has been converted into a systematic description of fractures—more or less complete.

We cannot congratulate the author on the success which has attended his efforts "to avoid the restating of traditions which have become obsolete,"—if, indeed, a tradition can ever become obsolete so long as it is capable of being restated,—"and the formulating of methods of treatment long since abandoned."

We are told on p. 34, for example, that Colles fracture occurs "at about one inch and a half above the joints, and on p. 37 that, "*as stated*, the fracture is most commonly situated from three-quarters of an inch to an inch and a quarter above the top of the styloid process of the radius." Apart from the inconsistency of the two descriptions, we venture to suggest that neither is a correct indication of the fracture now associated with the name of Colles. Curiously enough, in describing the clinical features, the writer makes no mention of the altered relations of the styloid processes at the wrist—but probably this is a tradition which has become obsolete. The author bewails the frequency with which impaired movement of the fingers and wrist follows this fracture, yet he insists on the importance of employing splints which control the fingers, and prevent the patient moving them.

Nor can we subscribe to Dr. Hopkins' teaching regarding the treatment of fracture of the patella—in most cases of which, in his opinion, operative treatment is inadvisable. We are pleased, however, to find that when operation is called for he prefers the open method, but we doubt, if it is true, that "few surgeons attempt to secure the fragments by drilling the bone." In any case we are satisfied that it is the best plan. The detailed description of Malgaigne's hooks and the method of using them might well have been omitted.

The author apparently still believes that the angle of the neck of the femur becomes more obtuse with advancing years, and is thereby rendered more liable to fracture. While the anatomical point is still in dispute, we had thought that its influence in predisposing to fracture had been disproved by the work of Stokes and others. He doubts, however, and we agree with him, the diagnostic value of the diminution in the arc of the circle described by the trochanter in fractures of the neck of the femur.

In such a work as this we should have expected to find more reference made to separations of epiphyses, which bulk so largely in differential diagnosis. Bennett's fracture of the base of the metacarpal of the thumb—a common surgical injury, although seldom diagnosed—is not even mentioned. The author's reference on p. 131 to the ambulant treatment of fractures of the leg clearly shows that he has had no experience of it.

This work is singularly free of those Americanisms which disfigure so many of the surgical writings of the author's compatriots. There are places, however, where a more careful selection of words would have rendered the writer's meaning more clear, and there are others where oratorical passages, not always grammatical, are introduced without any obvious advantage. Thus, for example, in the introductory chapter, in reference to the reduction of fractures by manipulation, we read that "such manipulation requires practice and dexterity, while the correct idea of form necessary to the full appreciation of contour would seem to be intuitive,—possessed by some without education, denied to others in spite of it."

While the work is beautifully printed in large clear type, and abundantly and admirably illustrated from photographs and radiograms, we can scarcely look upon it as an important addition to the literature of fractures.

ALEXANDER MILES.

Outlines for Dissectors. Parts I. and II. "Upper Extremity and Lower Extremity." By F. G. PARSONS, F.R.C.S. London: John Bale, Sons, & Danielsson. 1900.

THESE outlines are published to encourage students of anatomy to make accurate sketches of their dissections. The advantage gained by so doing is fully admitted. As the author remarks, many people unfortunately have no skill in drawing, and so he provides a series of outline sketches of various dissections of the extremities, which can be filled in by the student as each stage of the dissection is completed. At the side of each outline-drawing is printed a list of the structures which should be displayed and sketched in by the dissector. The outlines are clearly printed, and for the convenience of students they may be obtained either for the right or left extremity. There can be no doubt that a student who has worked conscientiously through one of these sets of outlines will have spent his time profitably, and have noted in his dissections many points which he would otherwise most probably have missed. The outlines will undoubtedly serve as a useful stimulus. A. F. DIXON.

Difficult Labour: a Guide to its Management by Students and Practitioners. BY G. ERNEST HERMAN, M.B., F.R.C.P. London: Cassell & Co. 1901.

ALL interested in obstetrics will welcome the appearance of a new edition of this excellent little work. While the book has been revised throughout, the most important alterations are those made necessary by recent improvements in the technique of Cæsarean section and symphysiotomy. The character of the original edition has been retained, the author's object being to give the reader definite guidance as to what it is best to do under given circumstances, rather than mention the many things which he may do. Though small in bulk the work is wonderfully complete, and it is difficult to find a complication of labour which is not dealt with in a manner worthy of the wide experience and sound judgment of the author. The edition will doubtless enjoy even wider popularity than its predecessor. W. E. FOTHERGILL.

Diseases of the Thyroid Gland. Part I. "Myxœdema and Cretinism." By GEORGE R. MURRAY, M.A., M.D. With Illustrations. London: H. K. Lewis. 1900.

THIS volume consists of three chapters, the first of which is devoted to a very interesting account of the structure and functions of the thyroid gland, the second to myxodema, and the third to cretinism, 108 pages in all. It is illustrated by numerous excellent reproductions of photographs and some charts, all of which have been taken from the author's own cases and specimens. The book consists essentially of an elaboration of the author's Goulstonian Lectures and of other previously published writings; and, needless to say, Dr. Murray has given us a thoroughly detailed and scholarly account of the subjects in question, well illustrated by numerous references to cases. Treatment by thyroid extract is dealt with in a very full and practically instructive manner. The book worthily sustains the great reputation which Dr. Murray has won by his researches on myxœdema and allied diseases of the thyroid gland. RALPH STOCKMAN.

Transactions of the American Dermatological Association at the Twenty-third Annual Meeting, held in the College of Physicians, Phila., 1899. Official Report. Concord, N. H.: The Rumford Press. 1900.

There is always a freshness and vigour about the meetings of the American dermatologists. One would think that in a limited subject such as that covered by skin affections, even though a modicum of syphilis is occasionally thrown in, there must necessarily be repetition, but this rarely happens. The volume which has just appeared is as good as any of its predecessors. Dr. Fordyce, the President, in his opening address took up many interesting points, and shed new light on some. Thus he remarked that the same organism may produce two or more substances of varying degrees of toxicity; the products of the bacillus of tuberculosis in the skin, for example, may differ from those produced by the organism in the lungs, bone, or lymph nodes; and this difference may explain the variations in the clinical course of lupus vulgaris as it affects the skin and mucous membranes, and the true tuberculous ulcer of the mucous membranes and adjacent skin. The same organism previously inoculated in the skin producing its peculiar toxine gives rise to a definite clinical picture, while the inoculation resulting from the bacilli grown in the lungs, with its different or more virulent toxine, results in a condition which is quite unlike the slowly progressing lupus. Yet another serum for the treatment of tuberculosis is referred to. This is one obtained by Schweinitz of Washington, by inoculating cows and horses with attenuated cultures of tubercle bacilli. He had induced with it partial or complete immunity to tuberculosis in guinea-pigs. Stubbert had employed it in a large number of cases of tuberculosis of the lungs, and had reported several cures. In two cases of extensive lupus cited, a marked improvement had resulted. It can be had gratuitously from the Department of Agriculture in Washington, and may be safely administered in daily subcutaneous doses of from 10 to 40 minims. So far no corroborative evidence has appeared. Hartzell communicated an important paper on epithelioma as a sequel of psoriasis, and the probability of its arsenical origin. An animated discussion took place on it, and the main conclusion arrived at may be found in a remark by Bowen, that "we should not speak of a close connection between psoriasis and epithelioma, or arsenic and epithelioma, but should merely regard arsenic as one of the causes of keratosis, and keratosis as a condition which not infrequently terminates in epithelioma." Geyer, however, mentions that among the inhabitants of Reichenstein in Prussia, where arsenic mining is carried on, carcinoma, having its beginning in "arsenic warts" on the fingers, is frequently observed. A paper by Bulkley on imperfect or deficient urinary excretion, as observed in connection with certain diseases of the skin, elicited the deduction that there was no positive connection between the condition of the urine and the diseases from which it was obtained for examination. Two cases where leprides occurred in extremely rare situations were recorded by Montgomery and Morrow. Abstracts of some of the other papers have already appeared in these pages, sufficient proof that they are of more than ephemeral value. There is no doubt that the short sederunt of the Association is made the most of.

W. Allan Jamieson.

Transactions of the American Gynæcological Society. Vol. xxv., for the Year 1900. Philadelphia: W. J. Dornan. 1900.

The *Transactions of the American Gynæcological Society* for the year 1900 form a bulky volume of 450 pages, which contains numerous papers of great interest and importance, and a number of drawings well executed and reproduced. Dr. Engelmann's presidential address deals with "The American Girl of To-day," a subject which has recently received considerable attention from his pen, and which he rightly considers to be of vast importance in preventive gynæcology. The majority of the communications treat of the details of pelvic and abdominal surgery. Webster and Dickinson insist on the use of casts and models in teaching. T. Aldis Emmett and J. C. Skene contribute historical papers. The remaining matter is mainly pathological in interest, and there are only three obstetric articles. Grandin mentions some interesting cases illustrating the toxæmia of pregnancy, and Davis and Harris give a very full description of a case which they consider to be one of syncytioma malignum. Most of the papers have appeared in periodic literature, and therefore do not demand detailed mention at this date. The volume as a whole represents a mass of work and thought of which the Society may well be proud.

W. E. Fothergill.

Transactions of the American Orthopædic Association. Vol. xiii. Philadelphia. 1900.

Like its predecessors, the present volume is full of interest for those interested in the surgery of deformities. Lateral curvature of the spine, which is described by Philps as rising each year before the Association like a spectre, is the subject of seven different papers, dealing with its etiology, pathology, and treatment. Potts' disease is a good second with six papers, mostly concerned with its mechanical treatment. Clubfoot takes the third place, with four papers. There are interesting reports on cases of congenital dislocation of the shoulder, wrist, and hip, and of cases in which an open operation was performed for ununited fracture of the neck of the femur. The illustrations are an important feature, and we congratulate the publishing committee on the high standard of excellence of this their thirteenth volume. Alexis Thomson.

Transactions of the American Ophthalmological Society. Volume ix. Part 1. Washington: D. C. 1900.

The volume before us consists of the *Transactions of the Thirty-sixth Annual Meeting of the American Ophthalmological Society,* held in Washington on May 2, 1900. It contains a full account, with discussions, of thirty-three contributions from the pen of several of the best known American authors, together with a list of office-bearers, members, etc. Although there is nothing of very outstanding importance or novelty presented, yet many of the papers, especially those dealing with clinical work, are of considerable interest, and are well worthy of a careful perusal. Considerable prominence, comparatively speaking, has been given to the recording of lesions of the frontal and adjoining sinuses and of the anterior ethmoidal cells, as well as to the operative treatment of entropion. Angus M'Gillivray.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,

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THEORIES OF INHERITANCE, ESPECIALLY OF ACQUIRED CONDITIONS, IN MAN.

In May last, Professor Adami (*N. York Med. Journ.*, June 1, 1901) delivered an address to the Brooklyn Medical Club, devoted to a consideration of the vexed but important question for mankind, of his inheritance of good, bad, and indifferent traits from his parents, or, through them, from more remote forebears.

The members of the medical profession apparently are agreed to pay little attention to the matter, to assume that such an influence exists, and, so assuming, to be content with the assumption. Biologists, of the tribe of the pure zoologists and botanists, have been left to hazard fearful and wonderful conceptions, largely based on morphological data; so fearful and fantastic, that medical men have not unnaturally passed them by, and refused to apply their propositions to medical subjects, the more as the trend of their theories seems strongly to oppose medical experience. The theory which alone deserves detailed consideration is that advanced by Weismann.

Weismann explains inheritance along the following lines:—The germ plasm, the essential matter of the fertilised cell from which the individual develops, must in the process of fertilisation come to contain portions of the germ plasm of both father and mother, the germ plasm of the father and mother must contain portions of the germ plasms of paternal and maternal grandfathers and grandmothers. And so, going back through a long series of generations, it follows, according to him, that representatives of the germ plasms of a long series of progenitors are contained in the nuclear material of each ovum and spermatozoon. The constitution of a germ cell, therefore, may be represented, for purposes of inheritance, as made up of a vast number of ancestral plasms, or "ids," derived from the long line of progenitors.

The acceptance of this theory is attended by some difficulties. It demands that the ids must be singularly stable in constitution—that they grow and multiply, but retain the same structure. But Weismann has to admit that, under certain conditions, the ids are modified in their structure. This admission, indeed, is contained in the idea that the individual hypothetical ids vary in their properties; and as, if we trace back these ancestral ids to their common source, they must all originally have been identical in structure, we conclude that at the same time they are both stable and capable of change in constitution. Here indeed is the crux of the theory. How are we to define and realise for ourselves the limits of alteration? Natural selection cannot explain the alteration, unless we fall back upon the far-away hypothesis of multitudinous separate acts of creation in the beginning of things—affording a large number of distinct idioplasms; and even this hypothesis does not work out satisfactorily.

It is absurd to regard the nucleus of the germ cell as containing a colony of what are, to all intents and purposes, separate and independent individuals (some of which have for centuries retained properties of one order, some properties of another), to conceive the germ cell as a colony of individual living beings, for this is what the theory demands.

Driesch's demonstration of the incompetency of the theory.—If in a segmenting ovum we find that normally each of the primitive segmentation cells give rise to one special series of organs or tissues, but if nevertheless the ovum of sundry animals can have its cells shaken apart at the two-, four-, eight-, and even sixteen-cell stage, and each separated cell can be found capable of developing into an entire, if dwarfed, individual, then obviously each time the nucleus segments there is no passage into the daughter nuclei of particular series of ids, destined to lead to the development of one particular region of the body. The variation in structure must be "a function of their relative position." The existence of these hypothetical ids is absolutely disproved.

Following Nägeli, the matter essential to, and directly concerned in, the vital activity of any one species or individual may be termed "idioplasm"; the not altogether essential elements, developed from and by the idioplasm, living yet non-controlling, "cytoplasm." Growth is essentially *a chemical process*, and a property of living matter. The discovery that many comparatively simple chemical bodies may, while still formed of the same constituents, present isomeric modifications in less or greater number, each isomeric change being associated with some difference in property, is important here. The components of malic acid, for instance, have been shown to occur in four different formations, each formation having one or more particular attributes. If four different arrangements of the atoms in such malic acid molecules are possible, and each of the four characterised by some idiosyncrasy, how many more molecular modifications of the infinitely more complex body, idioplasm, each with attendant variations in physical and functional action, may not be logically predicated?

Adami then proceeds to sketch out a new theory, free from the points in both Weismann and Driesch's which fail to satisfy certain conditions as presented to medical men. First existence is commonly regarded as beginning at the moment of birth, and all qualities of the new-born babe as inherited; although all changes in the fœtus *in utero*, from the day of fecundation, originated or influenced by external causes, are *acquired*, are not *inherited*, but may be spoken of as *antenatal* or *congenital*. Only those properties possessed by and derived from the germ plasms, the conjugation of which forms the initial step in each individual's life, can be truly described as inherited.

"Only that which is derived from the parental germ plasms is truly inherited."

Thus syphilis and tuberculosis, commencing *in utero* during the later months of pregnancy, are congenital diseases, acquired during life but before birth. It is hardly possible to conceive of either ovum or spermatozoon containing microbic germs of these diseases, and at the same time so escaping such injury that any development can follow.

Should idioplasm be wholly responsible for the structure of the individual, every different living being must be assumed to represent some different arrangement of idioplasm. Otherwise, the variations of idioplasm would have to be regarded as infinite. His theory, or the "Side-Chain Theory of Inheritance," is based upon a conception that primitive idioplasm consists of molecules formed of a central ring, to which various molecular side-chains can be attached, or from which side-chains can be detached without destroying this central ring. In the ovum the idioplasm molecules are of simple type; after fertilisation, they assume various complementary side-chains; when fully supplied with these, they may be regarded as sterile. Only cells which are undifferentiated, or have reverted to simpler forms, can undergo division; highly differentiated cells may not multiply.

When a unicellular organism gives up his personality in favour of two daughter cells, each part is directly endowed with all the attributes of her parent. Should they continue to live under the same conditions as their parent, they will correspond to her in all particulars, and transmit the same to their daughter cells in course of time. If, however, the two new cells go through different experiences, or enjoy greater amenities, their idioplasm molecules lose or gain certain loosely attached side-chains, and on fission give rise to a second generation exhibiting these alterations. Again, those hypothetical molecular side-chains, which have been induced the most recently to attach themselves chemically to the ring of simple protoplasmic molecules, are the readiest to desert.

Contrary to the rules laid down by Weismann, as to parthenogenesis and asexual reproduction, bacterial forms are comparatively easily endowed with new characters; while the longer these new characters are maintained, by reason of some change of environment, the longer is their retention, after return to normal conditions. The idioplastic molecules composing the bacteria partly undergo "side-chain modification"; partly remain unchanged.

When the idioplastic elements in the two parental cells join, they form a true chemical combination, yielding a product intermediate in character and constitution, but approaching more nearly to the constitution of the parent from whom the greater proportion or the more active idioplastic molecules proceed. The idioplasm is probably present in the nuclei of cells. In higher forms it is the nuclei of the germinal cells which are actively involved.

The evidence afforded by the undoubted effects of environment in the production of variation in character in bacteria, is proof of the readiness with which protoplasmic units respond to altered surroundings. "Inheritance and environment determine the constitution of the idioplasm and the structure of the cells."

Atavism may result from detachment of certain lately acquired side-chains from the family form of idioplasm, thus restoring the ancestral type.

Mutilations are not transmitted; here the germinal idioplasm is unaffected, unless the mutilation cause constitutional defect, which may be followed by defect in the offspring, not, except by chance, the same as the parent's.

Acquired diseases and their effects are not reproduced generally in the offspring as identical lesions; modification, however, of constitution is possible. Toxines in the blood of individuals undergoing immunisation must affect the germ cell, but although these individuals may have acquired immunity, it is rarely the case that the products of their germ cells inherit the same. When pathological toxines which do not possess the power of conferring future immunity, as in tuberculosis, are present, the tone of the body in general deteriorates, that of the germ cells *pari passu*; the idioplasm of the offspring is rendered less capable of repelling tuberculous invasions than normally, its molecular constitution somehow is more acceptable to the intruding bacilli, less able to overpower the foe.

"Herr Weismann would make the somewhat subtle distinction that we are not dealing with the direct transmission of acquired parental defects—that the toxines produce these results, not by acting on the body cells, but by direct action on the germ cells—that the inheritance is blastogenic, not somatogenic. This is a sorry and almost Jesuitic play upon words. Let us grant that they are of blastogenic origin; they are nevertheless of individual acquirement. The individual consists of body plasm and germ plasm, and whether the defects tell primarily or secondarily upon the germ plasm of the individual, we have here examples of conditions acquired by the individual being transmitted to the offspring."

But we can go further. "Exogenous and bacterial intoxications are not the only intoxications; we recognise yearly more and more the existence of states of truly endogenous intoxication, auto-intoxications—of disturbed states of the constitution, due to disturbances in glandular activity, or to excess of certain internal secretions, or of the substances ordinarily neutralised by the same. Such disturbances, acting on the germ cells, would be truly somatogenic."

If gout and the gouty diathesis are, as many hold them to be, of the nature of true auto-intoxications, if in a given percentage of cases (in France, 12 per cent., according to Bouchard) the gouty state shows itself in those giving an absolutely negative history of gout in their progenitors, then we are at liberty, I think, to regard the gouty diathesis as an example of truly somatogenic acquirement of an inherited and inheritable constitutional state.

SURGERY.

UNDER THE CHARGE OF

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OPERATIVE PARALYSIS OF THE SPINAL ACCESSORY NERVE.

PEARCE BAILEY records two cases in which accidental division of the spinal accessory nerve in the neck, in the course of an operation for diseased glands, was followed by serious disturbance of motion in the trapezius and sterno-masotid muscles. The usual experience is that the paralysis which results from section of the nerve is not particularly disabling, large portions of the nerve being resected for spasmodic wryneck without fear of serious loss of motor power, and the nerve is not infrequently divided accidentally, in the course of operations for tuberculous glands in the neck, without giving rise to any obvious disability. The additional supply to the trapezius from the cervical nerves explains the trifling disability so far as that muscle is concerned, and it is not an uncommon experience that the sterno-mastoid may be completely paralysed, or even removed altogether, without interfering with the attitude or movements of the head. The more interesting of the author's cases was that of a workman, who was operated on for a suppurating gland of the right side of the neck by an incision along the anterior border of the sterno-mastoid. A month later he presented a classical picture of unilateral paralysis of the sterno-mastoid and trapezius muscles. "The head was inclined slightly forwards, the shoulder was depressed, the arm hung heavily with slight forward rotation, the scapula was drawn away from the spine and rotated on its horizontal axis, and there was a slight scoliosis with convexity towards the left. The part of the neck and shoulder normally formed by the trapezius was greatly lessened in volume. This caused a sinking of the outline extending from the occiput to the acromion, and a loss in the fulness of the base of the neck on the affected side. The trapezius and sterno-mastoid were totally paralysed, and presented degenerative electrical reactions. The patient was unable to turn the head to the left, and had difficulty in bending the head forwards. The affection of the trapezius was shown by great disability in raising the shoulder and in adducting the shoulder-blade. The arm could not be abducted above a right angle. The patient was practically deprived of the use of his right arm for all heavy work." Six weeks after the original operation, neurorrhaphy was performed. The cut ends of the nerve were found to be separated by an interval of an inch. Within a few weeks of this suturing, the electrical reactions improved, but the subsequent improvement in motor power has been slow. The author, after referring to other recorded cases, arrives at the following conclusions:—The sterno-mastoid gets its sole innervation from the spinal accessory. The innervation of the trapezius varies; as a general rule, it is supplied both by the spinal accessory and the cervical nerves which pierce it, but sometimes this second supply is wanting, and the motor impulses reach the muscle exclusively through the spinal accessory, and section of it consequently means total palsy.—*Ann. Surg.*, Philadelphia, No. 5, 1901.

TREATMENT OF INFLAMMATORY STENOSIS OF THE RECTUM.

NAVARRO of Monte Video draws attention to a certain group of cases of stenosis of the rectum following upon proctitis, in which the narrowing of the gut does not consist in an annular stricture, but in a stenosis of the rectum as a whole, sometimes extending to the sigmoid flexure. While considerable improvement may follow on regulation of the diet and of the bowels and irrigation of the rectum, together with mechanical dilatation of the narrowed gut, this is often only temporary, and the troublesome symptoms associated with stricture of the rectum, namely, threatening intestinal obstruction, discharge, and tenesmus, may continue. For such cases the author recommends the complete extirpation of the stenosed bowel by the abdomino-perineal method, as in dealing with cancer, and establishing an artificial anus in the left iliac region. He gives notes of three cases in which this method of treatment yielded excellent results; in two of these there was a history of syphilis, and the inflammation, suppuration, and stenosis of the rectum followed upon coitus per anum; in the third, the cause of the proctitis was not ascertained.—*Rev. de Chir.*, Paris, June 1901.

THE RESULTS OF PRIMARY VERSUS SECONDARY NERVE SUTURE.

AT a recent discussion on this subject before the Surgical Society of Paris, Reynier maintained that the regeneration of a divided nerve and the restoration of sensory and motor functions is greatly influenced by the length of time which intervenes between the division of the nerve and the suture of the cut ends. When there is an interval of several hours or days, the restoration of motor functions does not take place until six months or a year have elapsed, but when the suture follows immediately on the division of the nerve, there may be an absence of any trophic, sensory, or motor paralysis. In two cases in which he divided the external popliteal nerve in the course of excising the head of the fibula, the immediate suture of the cut ends was followed by complete restoration of function. The abstractor had a similar experience; the ulnar nerve was accidentally divided in performing an excision of the elbow-joint for advanced tuberculous disease; the cut ends of the nerve were brought into apposition with catgut sutures, and when the dressings were removed a fortnight later there was no indication of any paralysis. Reynier's observations were not supported by the other surgeons who took part in the discussion, nor have they been confirmed by experiments on animals. —*Rev. de chir.*, Paris, June 1901.

THE BACTERICIDAL PROPERTIES OF UROTROPIN.

ORLOWSKI finds that the bactericidal powers of urotropin towards the majority of bacteria are distinctly inferior to those of carbolic acid or of corrosive sublimate, and are further diminished in the presence of albumin. It has, however, a very decided influence in restraining the fermentation of urine, much more powerful than that of salol. When administered internally, the acid reaction of the urine is increased, and in cases of cystitis with alkaline urine, the reaction may become neutral. Its administration is not attended with any undesirable accompaniments. —*Centralbl. f. Chir.*, Leipzig, May 25, 1901.

MAYDL'S OPERATION FOR EXTROVERSION OF THE BLADDER.

PENDL demonstrated a successful case of the above to the Medical Society of Vienna. The patient was a boy, æt. 7. The bladder was freed after securing the ureters by the introduction of a fine catheter into each, and was excised, saving only a portion 1·5 cm. long and 5 mm. broad, which included the openings of the ureters. The peritoneal cavity was then opened at the upper angle of the wound, and the sigmoid flexure exposed and incised longitudinally. The portion of bladder, including the ureters, was stitched into the opening, the sutured area being largely extra-peritoneal. At first the urine escaped continuously per rectum after two months there was continence for three or four hours. Frank reported that the patient demonstrated to the Society two years before, on whom a similar operation had been performed, was in the best of health, and was continent for five or six hours. The available statistics show that Maydl's operation has been successful in 87·5 per cent. of the total cases, a result which should dispel the fear of an ascending infection of the ureters and kidneys.—*Wien. klin. Wchnschr.*, 1900, No. 47.

REMOVAL OF THE ENTIRE STOMACH FOR CANCER.

VON BARDELEBEN records the case of a woman, æt. 52, in which he performed the above operation in August of last year. In dealing with the cardiac end, the œsophagus was pulled down as far as possible, ligatured and cut across, the entire stomach along with the diseased glands along its curvatures was removed, and the gullet and duodenum were then closed by means of a double row of sutures. The highest loop of the jejunum was then drawn upwards, and was anastomosed by means of sutures to the œsophagus at a distance of 14 in. from the duodeno-jejunal junction. The patient was fed by the mouth on the evening of the operation, and has subsequently gained 37 lbs. in weight.—*Deutsche med. Wchnschr.*, 1901, No. 15.

A CASE OF VOLVULUS OF THE STOMACH.

WIESINGER records the interesting case of a man, æt. 41, who was seized with symptoms of acute intestinal obstruction after partaking of an abundant meal. A swelling formed in the left hypochondrium, which gradually became diffused over the entire abdomen. Four days after the onset of his illness, he was admitted to hospital and submitted to operation. There was a considerable amount of blood-stained fluid and fibrinous clots in the peritoneal cavity. The swelling was at first regarded as a pancreatic cyst, with the stomach stretched in front of it. The omentum showed numerous areas of fat necrosis. After evacuating a large quantity of fluid, presumably from the interior of the stomach, that organ was found to be rotated around its own axis 180°, with the result that the cardiac and pyloric orifices were completely closed. After separating some recent adhesions and replacing the colon in its normal situation, it was possible to undo the volvulus. The gastro-colic ligament was displaced upwards, and fixed with sutures. The patient recovered.—*Centralbl. f. Chir.*, Leipzig, June 8, 1901.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Operative and Non-operative Treatment of Rupture of the Uterus.

Klein (*Arch. f. Gynaek.*, Berlin, Bd. xliv. Heft 1), in an exhaustive study of 318 cases, points out the following interesting facts:—Of 347 uncomplicated cases, 149 were operated on, with a mortality of 44 per cent.; 198 were not, and these show a mortality of 52 per cent. Of the latter class, 70 received no treatment whatsoever, and of those 73 per cent. died; the rest of this class, including 125 treated by drainage or irrigation, show a death rate of 39 per cent. While the rate sinks to 17 per cent. in 42 cases treated by drainage, Klein warmly recommends this line of treatment, and advocates the employment of rubber tubing. In cases where bleeding to death is threatened, immediate operative interference is required.

The Prevention of Post-Operative Adhesions of the Peritoneum.

Ward (*Am. Journ. Obst.*, N. Y., June 1901) contributes a paper on this subject. He calls attention to the frequency with which peritoneal adhesions follow abdominal and pelvic operations, resulting in many cases in persistent intra-abdominal pain, often worse than the original trouble for which the patients were operated on, or in chronic constipation, or in loss of life from strangulation or obstruction of the bowels. The statistics which he has gathered from many sources show that the mortality from the latter causes varies between 1 and 2 per cent. As to the etiology of peritoneal adhesions, opposite views are held. Kelterborn, Coe, and others maintain that they are the result of infection in all cases; Thomson, Gersuny, Van Stocker believing that they may occur under the most rigorous aseptic precautions. The weight of evidence is with these observers. The experimental work of Delbet, Grandmaison, and Brisset show the harmfulness to the peritoneum of antiseptic lotions, and the liability to the formation of adhesions which follow their use. Again, the elaborate and careful experiments of Walthard of Bern go to prove that exposure of the abdominal contents to the air, and more especially to the action of dry air, results in the ready and rapid formation of adhesions, whereas when the viscera were protected by gauze, moistened by normal saline solution, no such consequence followed. Walthard concludes that long-continued contact with air so damages the serosa that the superficial layer of cells dies, and that if two serous surfaces, thus treated, are in contact, adhesions form between them. Apart from exposure to atmospheric conditions, other causes may be at work in the production of adhesions, and these are the more frequent consequences of abdominal or pelvic operations. The introduction of a septic element may lead to general or circumscribed peritonitis, followed by fibrinous exudation and organisation, if the patient lives. Or traumatism may be a factor in the formation of adhesions. Trauma may lead to the necrosis of the endothelial cells of the peritoneum—(*a*) as a result of excessive manipulation of the serous surfaces, as is necessitated in prolonged and difficult operations; (*b*) as a consequence to the use of antiseptic lotions, such as carbolic acid, biniodide, and bichloride of mercury solutions. *Prevention of peritoneal adhesions.*—Strict asepsis is of course a *sine quâ non.* Again, all irritating lotions are to be strictly avoided. Denuded peritoneal surfaces and pedicle stumps have been treated in many ways. Martin brushes them over with sterilised olive oil before closing the abdomen. Stern has employed collodion. Morris is an advocate of the use of aristol, which is insoluble in serous fluids, and quickly forms a protective covering with coagulated lymph. As the pouch of Douglas is a frequent site of denudation, after breaking down adhesions, Kelly advocates fixing the uterus in a state of retroflexion, so as to close the entrance to the pouch. The author recommends abandonment of mass ligature, and the substitution of individual ligation of the vessels of the pedicle, and then covering the raw surface by suturing the peritoneum over it. He strongly urges the employment of gauze sponges, wet with normal saline, at a temperature of 115° F., to envelope the exposed parts as completely as possible. The loss of heat should be prevented by frequently renewing the hot saline solution, by the use of the Trendelenburg positions, and limiting the size of the abdominal incision. Before closing the wound, all blood clots should be removed. Another most important point to attend to, in preventing intestinal obstruction from adhesions, is the replacement of the loops of intestine and the omentum in their proper relations. The filling of the abdominal cavity with hot normal saline solution, so as to float the intestines and allow them to adjust themselves to the normal relations, accomplishes this better than any other means. Early catharsis should be induced, as intestinal movement is an adjuvant in the prevention of the formation of adhesions.

THE MENSTRUAL FUNCTION.

MARTELLI (*Ann. di ostet.*, Firenze, 1900, Nos. 9, 10, 11) reviews the many theories as to the cause and function of menstruation. The anatomical changes during menstruation are examined, and the following deductions made. A periodic hyperæmia occurs in the uterus, tubes, and ovaries; this begins eight to ten days before the sanguineous flow, and is the cause of the premenstrual tumefaction of the uterine and tubal mucosæ and of the distension of the more mature follicles. As a consequence of the hyperæmia, hæmorrhage occurs, from rupture of the smaller uterine and tubal vessels, and rupture of one or more Graafian follicles, with escape of the ova. Menstrual hæmorrhage represents the reserve of nutritive force elaborated by the female organism, in excess of its own requirements, in view of reproduction of the species. It appears only when the female development has reached a certain stage, and disappears when the amount of vital energy is sufficient for the support of the organism, with no excess to be devoted to conservation of the race.

INTRA-SPINAL INJECTIONS OF COCAINE.

AT a discussion on this subject, at the 13th Congress of the German Surgical Society, Berlin, April 1901, Bier, in analysing 1200 cases in which the method has been employed and published, comes to the conclusion that its many advantages are counterbalanced by disadvantages more or less serious, and certainly of frequent occurrence, ranging from headaches, hyperpyrexia, vomiting lasting for several days, to death. He has also tried eucaine, tropacocaine, but finds that their analgesic action is much less than that of cocaine, while secondary accidents were not absent. Kades of Cracow recommends the removal of a quantity of cerebro-spinal fluid, half as great again as the amount of solution to be injected. The strength he employs varies from 0·5 to 1 per cent., and the greatest quantity 0·07 cgrm. in an adult. He administers digitalis beforehand; and when the pulse becomes affected injects camphorated oil. With these precautions he had no serious accidents in sixty-five cases.

Mikulicz did not consider that the method had reached such a state of perfection as to be recommended in practice. He had tried it in forty cases.

Stone, in the New York Maternity Hospital, has obtained results in thirty-four cases. He finds anæsthesia lasts from half an hour to four hours and a half. He administers $\frac{1}{6}$ gr., repeated if complete anæsthesia does not follow. The solution must be freshly prepared and sterilised. This is not administered till the os is dilated to about 3 in. He found that if $\frac{1}{200}$ gr. hydrobromate of hyoscine was given before the injection of the cocaine, there was little or no headache. Pyrexia may last for twelve to fifteen hours after administration of the drug.

INCONTINENCE OF URINE TREATED BY INJECTIONS OF PARAFFIN.

GERSUNY, who has been investigating the effects of paraffin injections in various conditions, reports the following case (*Centralbl. f. Gynäk.*, Leipzig, 1900, No. 48):—Patient, æt. 25, operated on for vesico-vaginal fistula, had incontinence, from loss of sphincter function. Torsion of the urethra and other attempts to cure the condition having failed, 5 per cent. solution of cocaine was injected into the tissue near the vesical orifice, and into the submucous tissue Gersuny injected 3·5 c.c. of paraffin ointment, repeating it a week later. The result was the formation of a thick ring round the vesical orifice, necessitating the catheter for some days. Gersuny compares the condition produced to the effect of an enlarged prostate on the urethra. Five months after the injections the patient could retain the urine for four to six hours. Gersuny explains the result as due to the elasticity given to the tissues by the paraffin injections, which also produce a considerable narrowing of the vesical orifice, and throw the neighbouring mucous membrane into folds. The question of reabsorption of the paraffin is still unsettled, as the patient has only been under observation for nine months.

Pfannenstiel reports (*Centralbl. f. Gynäk*, Leipzig, 1901, No. 2) the case of a patient, æt. 39, suffering from incontinence following on extirpation of the urethra. The vesical orifice admitted the little finger. Pfannenstiel injected 3 c.c. of paraffin into the edges of the orifice, as carried out by Gersuny. The result was narrowing of the opening, barely admitting a sound. Shortly after the injection the patient showed all the symptoms of pulmonary embolism, from which she eventually recovered. Although the narrowing of the vesical orifice remained, the incontinence recurred; and Pfannenstiel points out that, although constant coughing may have accounted in part for the failure in this case, the occurrence of pulmonary embolism must be looked upon as a probable danger.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Light Treatment with Ultra-Violet Rays.

As sources of light, Finsen employed sunlight concentrated by glass lenses, and arc lamps concentrated by quartz lenses, with in each case interposition of a thin layer of water, to absorb the red, green, and yellow rays, which have no bactericidal action, and give rise to heat. Finsen found that the shorter the wave length the more actively bactericidal the rays. It has, however, recently been shown that a film of water 1·5 mm. in depth, or 2 cms. of air, is sufficient to absorb all the active rays. In order to bring the treatment into general use, we must find a source of light which is rich in violet and ultra-violet rays, and yet develops so little heat that it can be brought close to the skin, so that few, if any, of the bactericidal rays are lost. As a satisfactory source of light, Görl suggests the high tension spark, obtained by interposing a large Leyden jar parallel to a large inductor. If aluminium electrodes are used, a light is obtained rich in rays, extending to the extreme limit of known ultra-violet rays. It seems probable that these extreme rays are more powerful than the violet ones. Certainly they have a distinct action on the healthy and diseased skin. Using a spark of 8 to 10 mm. in length, Müller exposed his forearm to it at a distance of 3 cms. The exposure lasted an hour, and during it there was no abnormal sensation or burning feeling. At first there was nothing to be seen, but half an hour after the exposure the skin became red and itched slightly. For the next two days the redness deepened and spread slightly. There was slight discomfort, which gradually passed off; while at the same time the colour changed to yellow, which did nor fade on pressure. At the end of a week the skin began to desquamate, commencing at the edges of the exposed patch. The desquamation lasted a fortnight, after which a brownish discoloration was visible. This was preserved for more than ten months. With improved apparatus the same results are obtained with a much shorter exposure. Lupus tissue is similarly affected, and two cures are reported. As the development of the ultra-violet rays depends on the production of metallic vapour, and that again on the length of spark, the author hit upon the plan of lengthening the spark by interposing between the electrodes isolated aluminium balls, arranged either in circular form or in ∿ form. In this way the spark does not fly directly from electrode to electrode, but jumps from ball to ball, in this way increasing its length and also the production of ultra-violet rays. The author has had the small piece of apparatus constructed, so that by means of elastic bands it is possible to make the skin bloodless, which favours the passage of the rays through it. Despite the high tension and the closeness of the spark to the skin, it is impossible for the spark to touch the skin. By means of Görl's plan, anybody can employ the light treatment who possesses an ordinary Röntgen apparatus with a rotating interrupter, by inserting a Leyden jar. It is not necessary to alter the current or tension.—*München. med. Wchnschr.*, No. 19, 1901.

Dialysate of Digitalis.

Bosse holds that during the process of drying drugs the complex molecules may be affected, and that consequently the ordinary infusion, extracts, and tinctures may have lost something of the activity of the fresh plant. These molecules must be capable of diffusion, and must occur dissolved in the cell juices. He collected fresh leaves, crushed them, and immediately subjected the expressed juices to dialysation with increasing strengths of alcohol and water. The chemical activity of the completed dialysate was then fixed, and in this way exact dosage may be fixed for all the active constituents of the plant. In this way he hopes to be able to eliminate the irregularity and inequality of action so often noted with digitalis preparations. Jaquet showed, by experiments on dogs, that the activity of the dialysate exceeds that of digitalin, but is less than that of digitoxine. He fixed the dose of the dialysate as 6 to 10 drops, and the daily amount as 80 to 100 drops. Bosse tried the dialysate on a large number of patients, comprising all classes of cardiac disease. The preparation proved very successful in doses of 20 drops thrice daily. Its action was very prompt, and it proved a very powerful diuretic. In some cases it does not act for two or three days. Bosse has not noted any unpleasant symptoms, such as sudden alterations in pulse rate, or giddiness, vomiting, or sleeplessness. Bosse concludes that the preparation is no less active than the tincture and infusion, while it can be much more exactly dosed.—*St. Petersb. med. Wchnschr.*, No. 6, 1901.

HÆMOSTATIC ACTION OF GELATIN.

GEBELE had recourse to hypodermic injections of gelatin in three desperate cases of bleeding. In the first case the patient was a bleeder, who had uncontrollable hæmorrhage after extraction of a tooth. It recurred on the third day, and was treated by local application of 10 per cent. gelatin solution, and injection of 100 grms. of 2 per cent. gelatin saline solution into the upper part of the thigh. This caused the bleeding to cease in a few hours. The injection was repeated next day. There was no recurrence of hæmorrhage. Injection area became painful, and after ten days an abscess was opened, and found to contain sterile pus. In the second case a bleeder has epistaxis lasting for seven days. All ordinary treatment was useless, so gelatin was used locally as 10 per cent., and subcutaneous into each thigh 100 grs. of 2 per cent. gelatin in saline solution were injected. There was albuminuria. The bleeding ceased. Next day patient developed pneumonia, and died in a few days. The last case was one of recurrent epistaxis, which was cured in three-quarters of an hour by subcutaneous use of 100 grs. of 2 per cent. solution. The author draws attention to the fact that, thus used, gelatin is not an altogether innocent drug. In the first two cases albuminuria and rise of temperature were noted, while in one case it proved so irritating that an abscess formed. In all cases the solution was carefully prepared. The action of gelatin on animals was now more carefully considered. The author had considerable difficulty in finding a suitable method, but eventually hit upon the plan of weighing the blood obtained in a given time from similar veins before and after the injection. Thus, taking the small veins which run parallel to the posterior edge of a rabbit's ear, he found that, using 0·6 grm. of gelatin per 100 grms. body weight, the amount of blood flowing an hour after injection was only quarter of that flowing before injection. Using such doses the flow of blood from small veins is rapidly stopped, after the gelatin has had an hour to act. If larger amounts of gelatin, or much blood is taken from the animal, the effect is much prompter. The action on parenchymatous bleeding is very marked, while that on large veins or arteries is comparatively feeble. The repeated withdrawal of small amounts of blood from normal animals of itself tends to increase the coagulation of the blood, but the effect is not nearly so marked as with gelatin, and the author is convinced that the increase in coagulation is not due to the withdrawal of the small quantity of blood, but is solely due to the gelatin. Arterial hæmorrhage is hardly affected by gelatin injections. Only after an amount of blood equal to a quarter or more of the total blood is removed, is there much difference in the flow before and after gelatin. The author concludes that mere loss of blood increases the clotting power, and favours absorption of gelatin, which tends to increase clotting. Without this preliminary loss of blood gelatin is unsatisfactory. At least a fourth or fifth part of the total blood must be lost if gelatin is to act promptly. Hence its efficacy in bloodless conditions. In these cases, applied locally in 10 per cent. and subcutaneously in 2 per cent. solutions, it is very useful. For slighter bleeding the other methods of controlling hæmorrhage are better. It is consequently impossible to use gelatin injections prophylactically before operations. After gelatin injections it is rare for symptoms of irritation not to develop. The most common are slight albuminuria, fever, itching at the place of injection, and general restlessness. These occur, as a rule, in six hours, and pass off within forty-eight hours. Gebele considers that gelatin injections are contra-indicated in renal cases.—*München. med. Wchnschr.*, No. 24, 1901.

General Tuberculous Peritonitis treated with Arsenic and Bisulphide of Carbon.

The patient was a man æt. 47, who had had slight appendicitis at 17, and had for years suffered from obstinate constipation. The present illness commenced suddenly, with symptoms pointing to appendicitis, but symptoms of intestinal obstruction developed, necessitating an operation, which was followed by transient improvement. He gradually got worse, so that at the end of five weeks he was in a desperate condition, almost pulseless, with great abdominal distension and pain. Diarrhœa alternated with the passage of small hard scybalæ. The treatment was then changed to a morning injection of 0·05 grm. = $\frac{5}{6}$ gr. of sodium cacodylate, and a daily rectal injection of 5 grms. of bisulphide of carbon, dissolved in 500 of distilled water. Simultaneously, forced feeding was employed. Within a week a marked improvement was apparent. The abdominal veins were very enlarged. After each enema the patient experienced a sensation of great intestinal distension. On the eighth day the patient got up, and within a month the dimensions of the abdomen had become normal. The stools became abundant, solid, and well formed, which had not been the case for years. The patient was dismissed cured on the seventy-third day of this treatment, with instructions to continue taking the arsenic and to use the rectal injection once a week, or whenever his stools become smaller in size. The improvement cannot be ascribed to the after-effects of the operation, as for a month the patient got steadily worse. The authors consider that the arsenic acted as a general tonic, while the rectal injection of bisulphide of carbon had a local action on the intestine, rendering it antiseptic, and dilating the intestine and restoring it to its normal calibre, while at the same time its tonicity was improved. Under the action of the bodily heat the sulphide of carbon became volatilised, exerting a great tension on the intestinal wall, leading to its dilatation, and distension of the abdominal cavity. Reflex contraction of the abdominal muscles is caused, so that the intestinal muscles, alternately relaxing and contracting, are subjected to a form of massage which tends to restore their normal calibre and tone. For this reason the authors consider that rectal irrigation, with a saturated solution of carbon bisulphide, should always be tried in intestinal obstruction.—Schmidt and Traverne, *le Mois therap.*, Paris, May 31, 1901.

INSANITY.

UNDER THE CHARGE OF

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THE CLINICO-PSYCHOLOGICAL EXAMINATION OF THE INSANE.

DURING the past four years, Dr. Ferrari of Reggio (*Centralbl. f. Nervenh. u. Psychiat.*, January 1901), has persistently adopted a system of objective psychological examination of his patients which has proved very valuable. Taking as his fundamental principle the identity of stimulation, he has endeavoured to establish a system of what he terms "unity of measure," by the aid of which he claims that he is able to examine comparatively all the manifestations of insanity, and afterwards to observe how the patients conduct themselves when subjected to a uniform, identical series of frequently repeated stimulations. Mental tests, says the writer, ought to be exact, and constant experiments capable of being applied to all cases. In the insane they should be of such a nature as to show the alterations which mental disturbances produce in the mental activities. The objective method of psychological research is an analytic process, while the subjective method is rather synthetic in the direction of referring the case to a complex category of analogies. The one method is the complement of the other, but the subjective method cannot be dispensed with, as it gives unity and reality to scattered facts. His scheme of examination is divided into two parts—1. The clinical examination of the patient. This examination is intended to give a general conception of the psychical state of the patient. It should include a systematic investigation of symptoms with an attempt to measure perception and motor suggestibility, and an inquiry into the activity and will power of the individual. 2. The experimental examination of the patient. This can only be carried on with the aid of instruments of precision, which are only procurable in large asylums or in psychological laboratories, and its object is to elucidate any remarkable peculiarity found in the course of the first examination. While the clinical examination is always necessary, the experimental may or may not be dispensed with, according to circumstances. The first examination is therefore the one upon which he lays stress, as it is universally applicable. It consists of a careful inquiry into the personal appearance and attitude of the case; an examination of the sensory perceptions of sight, sound, and touch, by such simple means as showing the patient a watch, making a sudden noise at his back, and by gently tickling his cheeks, neck, or ears with a piece of paper. The author maintains that it is in the regular application of the same simple tests to a variety of patients that their value appears. The sensory tests are followed by a series of forty-seven questions, of which eight are intended to discover the condition of the patient's sense of time and space, four to find out his state of self-consciousness, nine to test his memory, seven his affective sense; six are intended to elicit delusions and hallucinations, seven the strength of his intellectual faculties, and six refer to the moral sense. The third part of the examination is devoted to giving nine orders or directions to the patient, and observing how he reacts to them. The whole examination should not take longer than from 16 to 18 minutes; and although it may appear at first sight childish and poor, the author claims for it the advantage of being purely objective, and therefore reliable.

Studies on Uric Acid in Neurasthenia.

These studies (*Am. Journ. of Insan.*, Utica, N.Y., July 1900) form a continuation of previous laboratory investigations published by the author, F. Savary Pearce, upon the urinary changes in cases of functional nervous disturbance. The studies, the author informs us, are intended to show the significance of the uric acid by-product as an index of disturbed metabolism. The writer feels that in the wide variation in the excretion of so important an end product as uric acid, we have sufficient data to say positively that neurasthenic conditions are associated with the circulation of such an irritant in the blood. From the observations of Haig, it seems clearly proven also that when the uric acid elimination is decreased, the urea elimination is proportionately increased. The amount of elimination of urea is in proportion to the albuminous food products properly absorbed into the blood, which, when ample, gives rise to a feeling of strength and latent vigour; but when the uric acid elimination goes above the normal, and the urea elimination falls, there assuredly follows a sense of feebleness and a lack of resistance. Laboratory experimentation has definitely shown that in health there is no such disproportion between the elimination of urea and uric acid. From this there are but two conclusions, namely, that physiological absorption of proteids is inhibited in an irregular fashion in the neurasthenic subject; or else that the condition is due to want of proper vasomotor control of the capillary blood vessels permitting an irregular and improper elimination of uric acid. From all this evidence, and from the clinical symptoms of the cases, it is probable that the units of the central nervous system become also enfeebled in their energising action. These observations are in accordance with the idea that the essential element in the treatment of neurasthenia is nutritional, and that, from a closer attention to dietetics, we may hope to gain the best results in the treatment of this disease.

Suicide and its Increase.

In an interesting paper by Styles (*Am. Journ. Insan.*, Utica, N.Y., July 1900) on the above subject, it is stated that in France for every 100,000 of the population there were from 1841 to 1845 nine suicides; from 1846 to 1850 ten; from 1861 to 1870 thirteen; from 1871 to 1875 fifteen; from 1876 to 1880 seventeen; for 1889 twenty-one; for 1893 twenty-two, and for 1896 twenty-seven. According to Durkheim, the number of suicides in Belgium from 1826 to 1890 increased 72 per cent.; in Prussia, 411 per cent.; in Austria, 238 per cent.; in France, 318 per cent.; in Saxony, 212 per cent.; while in Sweden and Denmark the increase has been only 72 and 35 per cent. respectively. That religion seems to wield an important influence in connection with suicide, is shown from the fact that in Roman Catholic communities suicide is less prevalent. Thus in German Protestant states the rate is higher than in Roman Catholic Bavaria, and in Spain and Portugal it is lower than in most Protestant communities. Generally speaking, the proportion per million in Roman Catholic states is 58; in Greek Catholic states 40; and in Protestant states 100. In Protestant Denmark and Sweden, we have, however, the lowest average of civilised countries. Marriage also exerts a restrictive influence without reference to nationality or religion. Out of 365 male suicides in Italy, collected by Morselli, 108 were bachelors and 157 widowers; and in France the number of widows who commit suicide is double that of women whose husbands are living. From general statistics, it is found that in 1,000,000 of unmarried people there are 975 suicides, or about one-third more than among the married, while in those who have children the ratio is nearly another one-third less, or, to be more definite, 336. The author believes that the two principal causative factors of suicide are suggestion and an impulse, which in the majority of instances is an inherited propensity.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF
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SUPPURATION IN THE SPHENOIDAL SINUS.

The question of the occurrence of suppuration in the sphenoidal sinus is one of very considerable interest. Notwithstanding the somewhat cut-and-dried descriptions that have been written of the symptoms and signs of this affection, the diagnosis is not always clear nor readily arrived at. Its association with suppuration in the posterior ethmoidal cells only increases the difficulty. The occurrence of intracranial complications in connection with suppuration in the sphenoidal cavity renders it all the more necessary that we should be able to recognise the condition during life, and deal satisfactorily with it. At the annual meeting of the Société Français d'Otologie et de Laryngologie, held in May 13th of this year (*Rev. hebd. de Laryngol.*, Paris, June 22, 1901), a discussion followed the reading of a paper on this subject by Furet of Paris (*Rev. de laryngol.*, Paris, May 11, 1901). Apparently no fresh light was thrown upon the question of diagnosis. Some emphasis was laid upon the occurrence of headache referred especially to the occipital region of the skull. These paroxysms are associated with the retention of secretion in the cavity, as the spontaneous evacuation of the contents of the sinus, or syringing of the same, is followed by relief of such symptoms. A certain diagnosis, however, is best arrived at by observing the flow of pus from the orifice of the sinus after having first removed the middle turbinated bone. The general feeling of the members who took part in the discussion was that the affection was not a common one—a view, however, which cannot be said to be shared by all rhinologists, to judge from a study of the literature of the subject.

In discussing the question of treatment of chronic suppuration in the sphenoidal sinus, three methods were introduced by the author to the notice of the Society. It is not necessary to do more than merely mention the first two, namely, opening of the sinus by instruments introduced through the nasal chamber from the anterior nares; and, secondly, exploration of the sinus through the frontal and ethmoidal cells as first practised by Jansen. The third method, and one to which we must refer in more detail here, is the opening of the sphenoidal sinus through the maxillary antrum. This operation was first described by Jansen at the International Medical Congress held in Moscow in 1897, and has more recently been detailed by Luc ("Leçons sur les suppurations de l'oreille moyenne et des cavités accessoires des fosses nasales," Paris, 1900).

In these cases, however, the maxillary sinus and the ethmoidal cells were also diseased, and the sphenoidal sinus was reached after the surgeon had dealt with the suppuration in these cavities. Furet in the paper above referred to has performed a similar operation, but in his case the other sinuses were healthy. The steps of the operation may be thus briefly detailed:—

The patient was a young woman who suffered from suppuration in both sphenoidal sinuses, but was free from any affection of the other accessory sinuses. The operation was only decided upon after unsuccessful treatment through the nose for six months. Under chloroform one maxillary sinus was opened through the canine fossa, a large aperture being made and special attention paid to the removal of the anterior osseous wall of the antrum towards its nasal part. Under good illumination the inner or nasal wall of the maxillary sinus is then removed with the gouge and mallet as far as its junction with the posterior wall. In this way a large communication is made between that cavity and the nasal chamber, and thus there is exposed to the eye of the operator the deeper part of the nasal chamber, the choana, the posterior part of the nasal septum, and the anterior wall of the sphenoidal cavity. The next step consists in applying the gouge directly to the anterior wall of the sphenoidal sinus, and breaking through it with a few strokes of the mallet. This is done through the upper part of the choana without interfering with the ethmoidal labyrinth. The sinus is then packed with iodoform gauze, and the incision in the buccal mucous membrane is sutured with catgut. Although both sphenoidal sinuses are diseased, each is reached through the maxillary sinus of one side, the septum between the two cavities being broken down. Subsequent packing of the sinuses is then carried out through the anterior nares.

The advantages claimed for this operation are that the distance to the sphenoidal sinus is less when approached through the maxillary sinus than through the anterior nares. The access is considerably larger, while the sinus comes more immediately under the eye and the hand of the operator.

Two interesting cases of disease of the sphenoidal sinus associated with blindness were reported by Victor Miller (*Brit. Med. Journ.*, London, December 22, 1900). Both cases proved fatal from intracranial complications. In the first case, the patient, apparently a healthy lad, was suddenly seized with convulsions, and became unconscious for nearly an hour. Three days later he had another fit, and in forty-eight hours became totally blind. Both discs were found to be pale, and in the left the veins were over distended. The nose contained foul-smelling pus, and both the ethmoidal and sphenoidal air cells were found to be diseased. The sphenoidal sinus was opened, and a freer flow of pus from the cavity was followed by some amelioration in the patient's condition. A month later, however, he was again seized with convulsions, and developed facial paralysis and divergent strabismus. Death rapidly ensued. No sectio was permitted, but the conclusion arrived at was that suppurative meningitis had arisen in connection with the disease in the sphenoidal sinus. The second case was that of a young girl afflicted with blindness, and in whom there was reason to believe that hereditary syphilis existed. The nose was filled with crusts suggestive of ozæna, and there was evidence of the existence of disease in the sphenoidal sinuses. These cavities were accordingly opened. Both optic discs at this time showed commencing atrophy. Thirteen days after the operation upon the sinuses, the patient became drowsy, and the temperature rose. The somnolency gradually increased, and was followed by coma and death. Post-mortem examination showed that the ethmoidal cells and the sphenoidal sinuses contained pus, while the bony walls of the cavities were soft and carious. "The whole brain was soft and putty-like in consistence, evidently the result of a general softening."

More than one case has now been recorded in which a fatal intracranial complication has followed upon suppuration in one of the accessory sinuses, where coincident suppuration in the middle ear has led the surgeon to open the mastoid antrum and explore the temporosphenoidal lobe with a negative result. We have already referred to two cases of this kind in a previous number of this Journal. Another case has been recently recorded by Dodd (*Laryngoscope*, St. Louis, May 1901). It differs, however, from those previously reviewed by us, in the fact that the ear condition was acute, and that the possibility of a co-existing affection of the sphenoidal sinus was discussed before the patient's death, he having been under treatment for a purulent nasal discharge. In this case, too, the brain was not explored, but the mastoid process was opened, and pus evacuated.

A week after the mastoid operation, the patient began to complain of great pain in the head. The temperature varied, but tended to rise. Vomiting occurred, and there was some deviation of the right eye and inequality of the pupils. Delirium set in. Later there was some congestion of the optic nerves. Death occurred on the fourth day after the onset of the serious symptoms. The autopsy showed no mischief in the region of the temporal bone. The sphenoidal sinus contained pus, and its walls were soft and carious, while upon the base of the brain there was a localised purulent meningitis.

A LARYNGEAL LESION AS AN EARLY SIGN IN THE DIAGNOSIS OF TYPHOID FEVER.

THE occurrence of laryngeal complications in the course of typhoid fever is well recognised. The period at which a lesion may be met with in this situation varies, but as a rule it is somewhat late in the course of the fever. Attention, however, has not been drawn, at any rate in this country, to the possibility of an affection of the larynx being an early manifestation of the existence of typhoid fever. Franz Schmidt (*Monatschr. f. Ohrenh.*, Berl., April 1901) has recorded two cases of some interest in which laryngoscopy demonstrated the presence of an unusual form of inflammation of the epiglottis. The recognition of this condition in cases of fever of a doubtful nature must be regarded as affording some assistance in the diagnosis of typhoid fever. The first patient presented himself at the clinique of von Schrötter on the fourteenth day of his illness. We shall merely describe here the appearances of the larynx. He had complained of pain in the throat and dysphagia. The upper margin of the epiglottis, especially towards its laryngeal surface, was covered by a white film resembling an exudation, which was bounded by a fine red surface. Six hours later this had spread forwards, and had become still whiter. The lingual surface of the epiglottis was considerably reddened and injected, as well as the mucous membrane covering the arytenoid cartilages. There was a slight catarrh of the vocal cords. On the following day Widal's reaction was obtained. The condition of the epiglottis became more marked, and then improved, so that, on the twenty-seventh day of the illness, the inflammatory signs had disappeared. In the second case a somewhat similar condition of the epiglottis was observed when examined on the tenth day of the illness. On the twelfth day Widal's reaction was obtained. The affection of the epiglottis continued through a considerably longer period, and even on the fifty-fifth day of the illness there was still slight redness and swelling of the mucous membrane covering the margin of the epiglottis.

TUBERCULOSIS OF THE TONGUE.

CHAPPELL reports the occurrence of secondary tuberculous infection of the tongue (*Trans. New York Acad. Med.*, March 27, 1901). Primary tuberculosis of this organ is rare, but he had seen one case. Several cases of secondary infection have been reported. The author had observed ten cases during the past three years. He considered that the condition occurred in connection with a surface abrasion, and usually as a late manifestation of pulmonary or laryngeal disease. The first evidence of its existence in the tongue was the appearance of a nodule at the site of some abrasion. This nodule then broke down, so that an ulcer or fissure was formed. In eight of his cases the ulceration was upon the tip and sides of the tongue; in the remaining two it first appeared in the centre of the tongue, near its base. The ulceration is painful; it is flat or irregular, without any surrounding hardness. Its base is formed by a tough, glistening membrane of a pearl-grey colour, quite unlike what is observed in other forms of ulceration of the tongue. There was no glandular enlargement in any of the cases. The pain was usually severe, but of an intermittent character. Chappell draws attention to the fact that the disease in the tongue was amenable to treatment. In a primary affection the part should be excised, but when secondary, he advised delay, so long as the patient's general condition was bad and showed evidence of active tuberculous mischief. After cleaning the surface of the ulcer with peroxide of hydrogen, all the necrosed tissue is removed by curetting the surface under cocaine anæsthesia. Lactic acid is then applied, and the ulcer covered with a solution of iodoform and benzoin, twenty grains to the ounce. This treatment should be repeated daily. At a later stage a weak solution of nitrate of silver may be used.

An Accident attending the Operation upon Adenoids.

Holmes reports two interesting cases in which the curette was broken during the operation for the removal of adenoid growths (*Laryngoscope*, St. Louis, May 1901). The first case was that of a child æt. eight years. Chloroform anæsthesia was employed. Gottstein's curette was inserted in the ordinary way, and no sooner had pressure been made with it than a loud crack was heard, and when the instrument was indrawn, the distal portion of the curette bearing the blade was found to be missing. The finger was at once inserted into the naso-pharynx, where it came in contact with the broken piece. The child's body was then inverted; but as the surgeon could not insert two fingers whereby to grasp the piece, and as he did not possess a pair of curved forceps, it was difficult to see in what way to extract the foreign body without running any risk of its being swallowed or passing into the larynx. Holmes therefore pressed the sharp, broken edge of the instrument into his finger, and by a quick movement dragged it into the mouth, from which it was removed with forceps.

In the second case, which was under the care of Dr. Garlick, a somewhat similar accident happened, a portion of the ring of the curette breaking off. Notwithstanding an immediate attempt to secure the broken piece, it was swallowed. Fortunately the sharp edges caused no damage, and the piece was passed per rectum on the fourth day.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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Report of the Medical Officer to the Local Government Board (England), 1899–1900.

Pseudo-tuberculosis.—Dr. Klein gives the results of his investigation of this disease. He restricts the name to the definite disease, subacute to chronic, caused by the *Bacillus pseudo-tuberculosis* of A. Pfeiffer. As regards the distribution in nature of this bacillus, Klein has recovered it from the lesions in the organs of guinea-pigs, subcutaneously injected with the sediment deposited from the water of the rivers Lea and

Thames, with the sediment of crude sewage, and of sewage effluent. Of five guinea-pigs injected with the sediment from milk sold in London retail shops, two became affected with pseudo-tuberculosis; and of ninety-seven samples of milk delivered at London railway stations, six produced the disease when their sediment was injected into guinea-pigs.

In the case of guinea-pigs, he did not find giant cells present in the nodules of pseudo-tuberculosis; but in the case of two monkeys injected, he found them present in the nodules in the spleen. The pathological features are remarkably like those of tuberculosis, but the disease is more rapidly developed. If an animal be inoculated with *B. pseudo-tuberculosis*, which has not long before been inoculated with *B. tuberculosis*, the two diseases progress simultaneously though not at equal rates. Klein considers that the antecedent injection of attenuated *B. pseudo-tuberculosis* has a decided effect in retarding induced tuberculosis.

Typhoid bacillus in the soil. — Dr. Sidney Martin contributes a further report on this subject. He gives the results obtained by growing *B. typhosus* along with individual soil bacilli. These appear to depend on the nature of the soil micro-organism and on the temperature of the experiment. As a rule, at both high (37° C.) and low (4° C.–10° C.) temperatures, the growth of the bacillus is impeded, and it ultimately dies, while the competing micro-organism continues to grow. His conclusions from all his work on this subject are—(1) That certain cultivated soils, especially garden soils, when sterilised, are favourable to the growth of *B. typhosus*, while in virgin soils, similarly sterilised, it rapidly dies. (2) That if *B. typhosus* be added to very moist unsterilised soils, kept at a temperature of 19° C.–37° C., it cannot be recovered, even after a short period; but if the soil be drier, and at a temperature of 2° C.–12° C., it can be recovered after as much as twelve days. (3) That the disappearance of the bacillus in unsterilised soil is probably due to the putrefactive organisms present in the soil.

Bacteriology of scarlatina.—Dr. Gordon contributes the results of his continued investigation of this subject. He had previously shown that various streptococci had a tendency here and there to form an element which might be more correctly described as a bacillus than as a coccus. He now finds that this occurs to such an extent in pure cultures of *S. scarlatinæ* as almost to be characteristic; and, taken along with the coherent conglomeration of the growth in broth culture, has enabled him to morphologically differentiate it from thirty representative examples of *S. pyogenes* with which he compared it.

He confirms his previous observation as to the constant occurrence of the *S. scarlatinæ* or *conglomeratus* on the tonsil or fauces of both mild and severe cases of scarlatina; he failed to find it in four inflamed non-scarlatinal throats, in which, however, other virulent streptococci were present. *S. scarlatinæ* may be present in the nasal discharge, but he failed to find it in the discharge from the ear. He found it in the pleural effusion which occurred as a complication in a case of scarlatina under treatment, and in the blood and tissues of fatal cases, sometimes in pure culture. His whole investigation supports the view of Dr. Klein, that the *S. scarlatinæ* is distinct from the *S. pyogenes*, and that it is causally related to scarlatina. He thinks that the word "specific," as applied to this micro-organism, should in the meantime be avoided.

REPORT OF THE MEDICAL OFFICER TO THE LONDON COUNTY COUNCIL, 1899.

Overcrowding and phthisis.—Dr. Shirley Murphy shows, in a striking way, that while the death-rate from all causes increases with overcrowding, that this increase is much more marked in the case of phthisis. While the population that is badly housed suffers from other consequences of poverty than insufficiency of accommodation, yet, however far these may contribute to the production of phthisis, there is ample reason for thinking that the dwelling itself and the manner in which it is occupied are important factors in determining the prevalence of the disease. The following figures for 1899 are taken from his Report. He takes all districts in which the tenements have less than five rooms, and classifies them according to the percentage of their population living more than two in a room.

	Death rate per 1000 from Phthisis.			Death rate per 1000 from all causes, less Phthisis.		
	All Ages.	25–35.	35–45.	All Ages.	25–35.	35–45.
Districts with less than 10 per cent.	1·18	1·56	2·45	14·04	2·98	6·81
,, ,, 15–20 ,,	1·68	2·08	3·71	17·45	3·97	9·31
,, ,, 25–30 ,,	2·13	2·66	4·23	18·34	4·47	10·33
,, ,, above 35 ,,	2·68	3·83	6·25	21·35	5·70	11·64

The sanitary condition of cemeteries and burial grounds.—This embodies a report prepared by Dr. Young, Assistant Medical Officer of Health. Within and around the County of London there are still remaining 1300 acres of land available for burial in the existing cemeteries and graveyards, but about 500 acres of this, consisting of London Clay, is quite unsuitable for the purpose.

The conditions that favour the decomposition of the body are, under existing methods of burial in London, interfered with. The influences which hinder this change are—(1) the depth at which bodies are buried; (2) the character of the coffins in general use; and (3) the character of the soil. According to the Regulations of the Home Office, no body can be buried within less than 4 ft. from the surface in the case of an adult, and 3 ft. in the case of a child under 12 years. As regards depth of grave, in private graves it is from 9 to 12 ft., and in graves for *common interment*, 12 to 18 ft. is not uncommon. Sir Seymour Haden's experiments on the influence of depth of grave on rate of decomposition, are quoted. He buried various kinds of animals, *e.g.* calves, dogs, etc., at different depths, and found that it required more than four years for the complete decomposition of a body buried at a depth of 4 ft.; at a depth of 3 ft., three years; and of 2 ft., two years. Since at a depth of about 5 ft. from the surface there is a marked diminution in the number of micro-organisms in the soil, it is apparent that burial at great depths must be unfavourable to the rapid decomposition of the body. Coffins are generally made of elm and oak, woods which decay very slowly. In some cases graves have been opened down to the last interred coffin, and this, though buried for a considerable period, was quite intact. As illustrating this point, the experience of the Commission appointed by the Prussian Government, about two years after the Franco-German War, to inquire into the condition of the dead in some of the battlefields in the Vosges, is interesting. In a case in which as many as 800 bodies had been buried in a shallow trench, only bones and accoutrements remained. The bodies of officers buried in macintoshes had not so disappeared.

To remove the obstacles to the process of decay, coffins of a readily perishable nature have been proposed, and the so-called "earth to earth" coffin seems best to meet the requirements. It is made of paper pulp, or millboard, about ⅛ in. thick, on a framework of wood, with a wooden bottom to give it stability for the weight of the body. It is lined internally with a waterproof lining, and externally it is covered with cloth, and has the usual fittings. When placed in the earth, this coffin disintegrates in from two to three weeks. The price varies, but it is much the same as that of ordinary coffins, and in its simplest form, such as might be used for the burial of paupers, it would cost about £1. Such coffins are not, however, used to any large extent by the community.

A light, porous, sandy, or gravelly soil is the best for inhumation. It is well aerated and dry, and in those particulars it is the very opposite of the stiff tenacious clay of which a large extent of the ground available for burial in London consists. The final result of burial in such clay soil seems to be either—(1) the body remains without much external change, or (2) the products of decomposition pass into a liquid form, and are retained in the grave for an indefinite period. The gases of decomposition may be retained for a long time, causing an effluvium, interfering with the work of the grave-digger when the grave is again opened. Deep draining, the putting of burnt ballast or other loose material in the bottom of the grave, and other similar means, may to some extent improve such soil, but cannot make it suitable for burial. If a body contained in a perishable coffin were buried in a suitable soil, near the surface, then after a certain period only the skeleton would be left, and the soil would be again available for the purposes of burial. In these circumstances it would be possible to provide, once for all, the amount of land necessary for the disposal of the dead in a given population. But before adopting such means, further information is needed as regards the human corpse, as to—(1) whether any nuisance would be caused by such superficial burial, and (2) the period after which the ground could again be used. The present regulations imply that fourteen years is sufficient for the latter, while Schutzenberger's observations show that in an averagely porous soil only a period of five years is required. It is estimated that if surface burial were adopted in London, about 70 acres of land would be required annually for the number of deaths that occur there.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*July* 3, 1901.—Mr. A. G. **Miller**, President, in the chair.—Professor **Sims Woodhead** opened a discussion on "Alcohol in its Medical and Scientific Aspects." His address appears in this number of the Journal. Prof. T. R. Fraser said that the chief question was one of dosage. Restricting himself to speaking of small doses, he showed how great was the value of alcohol as a cardiac stimulant. It acted with great rapidity, and was followed by no period of depression. By dilating the peripheral arterioles, it flushed the more distant tissues with blood, and increased their vitality. There could be no question of its food value, and the very rapidity with which it was oxidised was of the greatest use in supplying energy to tide a patient over the crisis of an acute illness. Its antipyretic qualities, too, were frequently utilised. In another application it acted as a stimulant to primary digestion, increasing the flow of saliva, improving the appetite, and exciting gastric peristalsis and the peptic secretion. He did not think that it had any effect in increasing the liability to infectious diseases. The mortality of plague among Hindus—abstainers—was 99 per cent., while among Europeans it was not more than 30 per cent. Dr. Clouston, in speaking of the relation of alcohol to mental disease, pointed out that while it was entered as the cause in 25 per cent. of the admissions to Morningside Asylum, in Dorsetshire, where the percentage of insane persons to the general population was the same as in Edinburgh, it was given as the cause in only 5 per cent. It seemed that persons of the neuropathic diathesis, delighting in the exercise of the emotional and artistic faculties, derived supreme gratification from alcohol. Its action was twofold: diminishing inhibition, and increasing emotional pleasure. The frequency of alcoholism among the insane seemed to be a consequence as much as a cause of the neuropathic constitution. Experiment had shown definitely that it diminished the mental output, and that so far from toleration being established, the succeeding doses had more effect than the first one. He dwelt upon the desirability of a Scientific Commission being appointed to inquire into the whole question, and the importance of further legislation for the care of inebriates. After remarks by other members of the Society, Professor Woodhead replied.

Edinburgh Obstetrical Society.—*July* 10, 1901.—Dr. **Milne Murray**, President, in the chair.—Professor **Simpson** introduced a discussion on "The Management of the Third Stage of Labour." He gave an account of the various methods adopted from the earliest times to effect delivery of the placenta, and, in conclusion, described his own practice in the management of this stage of labour. Many Fellows took part in the discussion.

OBITUARY.

Peter Guthrie Tait, F.R.S., LL.D.

One by one the great men who have adorned the city in our time have been called away; our recent loss is one of the greatest we could have sustained—the death of the Father of the Senatus, Professor Tait. During a considerable portion of last year, indeed ever since the terrible sorrow of February, it became more and more evident that the vigour of his magnificent frame was failing; but with undimmed intellect, and unabated enthusiasm, he continued his labours in the service of the University. In December, however, his health completely broke down, and he found it necessary to relinquish his duties. Since that time he has been almost entirely confined to the house, but he went recently to the home of his friend, Sir John Murray, at Wardie, in order to have the fresh breezes of the Firth, and there he suddenly, but not unexpectedly, passed away, early in the morning of 4th July.

Peter Guthrie Tait was born at Dalkeith, April 28, 1831, and educated first at the Circus Place School and the Edinburgh Academy; afterwards at the Universities of Edinburgh and Cambridge. In 1852 he became Senior Wrangler, Smith's Prizeman, and a Fellow of Peterhouse. In 1854 he was elected to the Chair of Mathematics at Queen's College, Belfast, and on the death of Forbes, in 1860, he was transferred to the Chair of Natural Philosophy in Edinburgh. Like so many others, therefore, who have thrown the lustre of great achievements upon our Alma Mater, he was appointed in early life. From the date of his election to the University, he was one of the most remarkable features of the galaxy of intellect then shining in its firmament, and he was beyond all question the most brilliant of the group. Following such a man as Forbes, there might well have been some misgivings as to his success, but from the outset he showed that he was more than equal to the demands of the Chair. Possessed of contagious enthusiasm, he at once made it manifest that he was born to teach, and the dullest youth who listened to him never failed to receive some sparks of the divine fire. One of the most advanced mathematicians of his time, and probably the most profound student of mathematical physics of the age, he was nevertheless able to bring himself into touch with the weakest mind he had to teach, while his kindly wisdom and subtle humour served of themselves as life lessons of the weightiest value.

The late Professor had few equals, and no superior, in the field of original research. His numerous contributions were scattered through many journals, but, with a rare sense of loyalty to his own school, the greatest proportion are to be found in the *Transactions* and *Proceedings of the Royal Society of Edinburgh*. One of the most gratifying tributes paid to him recently was the publication by the University of Cambridge of these original papers.

In the domain of exposition it is only necessary to mention the names of some of his works:—"Dynamics of a Particle," "Quaternions," "Thermo-Dynamics," "Heat," "Light," "Properties of Matter," "Dynamics." Each of these is, even to one outside the pale of exact science, luminous and lucid to an extraordinary degree. With his friend, Sir William Thomson, now Lord Kelvin, he wrote the most profound work that has appeared since the "Principia" of Newton—"Natural Philosophy"; and with Professor Balfour Stewart he was the author of that wonderful volume, "The Unseen Universe." Truly his was a life of marvellous productiveness.

As a student of exact science the late Professor had a kind of good-natured tolerance for those given up to the observation of animated nature, and a hearty contempt for the more arrogant of the biologists, whose hypotheses he could not away with. One of his favourite dicta was that biology was not, and probably never could be, a true science; and he was often heard to say that natural science, so called, had never produced a Kepler, and never could in the nature of things give rise to a Newton. His nature being above all absolutely truthful, and perfectly loyal, he had an instinctive abhorrence for and hatred of everything that savoured of quackery, whether in matters theological, political, or scientific, and his habit of mind led him to express frank criticisms with a burning sarcasm, yet withal free from any trace of rancour. His enthusiasm in the search for truth was one of the most stimulating influences in the life of all who came in contact with him; and the kindly helpfulness that led him to devote much of his time to clearing up the doubts and difficulties of others, rendered him very dear to his followers. In a word, to know him was to love him.

In point of character, if it may be permitted to touch on anything of the kind, it may be said that our late Professor was one of the noblest of men. His nature was transparent in its simplicity, and he was one of the pure in heart. Greater even than his scorn for cant and humbug, was his loathing for anything that savoured even in the least degree of coarseness of thought or looseness of life.

It seems but yesterday that we first set eyes on him who has just been taken from us, although it was in the dawn of the seventies. John Murray was warming his back at the stove, the Lindsays—father and son—were revolving around him like the satellites of some beneficent planet, and Marshall was arranging some apparatus for a lecture; a roar of welcome announced the coming of the Professor, who with a few vigorous strides gained the desk and took in the whole mob of undergraduates with a kindly twinkle of his sparkling eyes. The other day at his last resting-place there were assembled, to pay the last tribute of affection and respect, many of those present at that scene of thirty years ago; but in that representative gathering, headed by the veteran Lord Kelvin, some were missing who have preceded their friend to the grave.

The time has not arrived for any true estimate of the great man whose loss we now mourn—all other thoughts are as yet overshadowed by the sense of personal bereavement, for the expression of which words are hopelessly inadequate; we can only bow our heads with sorrow that we shall see his face no more, while our hearts go out with loving sympathy to those whose privilege it was to be near and dear to him.

ANALYTICAL REPORTS.

◆

Peter Möller's Hydroxyl-free Cod-Liver Oil.

The statement may be safely ventured, that of all the specimens of oil extracted from the livers of *Gadus morrhua*, Möller's is the purest, the most palatable, and the readiest of digestion; but it must be added, in all honesty, by no means the most economical. We have before this had occasion to expatiate on the merits of Peter Möller's Oil—not upon its cost; and we are aware of the debt scientists owe to the talented inventor of the steam process of manufacturing cod-liver oil; to his firm's most erudite and technical treatise on organic chemistry, published in 1895; to the value of the discovery made by the chemists of the firm, that, by replacing air with carbonic acid during the process, hydroxyl-free oil can be obtained; to the Orders of Vasa and St. Olaf conferred on the founder of the firm by his King; to the twenty highest prizes awarded at different exhibitions—but we have had practical experience of its price.

No doubt the cod-liver oil fats, as Möller states, "are entirely different from other fats," and when presented in their purest guise are exquisitely absorbable. But a fat is a fat; it contains so much carbon, so much hydrogen, and so much oxygen; it can never be a true food, for it is not nitrogenous; but it excels in carbon, and therefore burns easily. All natural fats absorbed into the body have an after history approximately the same; if metabolism is efficient, they burn; if the draught be too weak for full combustion of all the fuel intaken, they burn; but the other elements of the food smoulder and breed nuisance. Therefore conceding, as we do, the superlative merits of Möller's Cod-liver Oil, and even the useful frailty of its molecular constitution, the fact that a teaspoonful dose is said to be sufficiently efficacious savours of The greater the price the greater the benefit, for however pure a fat may be, it can scarcely surpass butter in metabolic value. A teaspoonful of butter is relatively of as much value as any of the purest oils, provided it can be tolerated, while its cost is quite out of proportion. If only butter were looked upon as a necessary drug, not a sparse adjuvant for the staff of life, cod-liver oil were not needed. If Möller could but produce his oil at less expense, those who suffer from personal distaste for food fats, or inability to assimilate them, might be induced to confer benefit upon themselves by sipping larger doses than single drachms of his excellent product.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FIVE WEEKS ENDING 29TH JUNE, 1901; AND FOR THE YEAR FROM JANUARY 1.

	TEMPERATURE.			RAINFALL IN INCHES.		SUNSHINE. HOURS.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	53°·1	[1] 412°	6°	2·6	13·6	200	702	2°·7
		[2] 880°	612°					
Observed	52°·9	[1] 387°	3°	3·2	12·9	247	794	2°·4
		[2] 828°	657°					
Difference	−0°·2	[1] −25°	− 3°	−0·6	−0·7	+47	+92	−0°·3
		[2] −52°	+45°					

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH, DUNDEE, ABERDEEN, AND LEITH), DURING JUNE, AND SINCE JANUARY 1, 1901. Actual Numbers and Rate per 10,000 per annum.

		TOTAL.		CONSTITUTIONAL DISEASES.		CIRCULATORY SYSTEM.		RESPIRATORY SYSTEM.		NERVOUS SYSTEM.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1]	1090	184·0	242	40·9	102	17·3	181	30·2	129	21·6
	[2]	7238	203·4	1434	40·2	687	19·2	1492	41·8	822	23·0
Actual Deaths and Rate per 10,000	[1]	959	162·0	221	37·3	108	18·2	142	23·9	98	16·5
	[2]	7190	202·1	1476	41·4	713	19·9	1295	36·3	801	22·4
Difference from Mean	[1]	−131	−22·0	−21	−3·6	+ 6	+0·9	−39	−6·3	−31	−5·1
	[2]	− 48	−1·3	+42	+1·2	+26	+0·7	−197	−5·5	−21	−0·6

		DIGESTIVE SYSTEM.		URINARY SYSTEM.		PNEUMONIA.		PHTHISIS.		CANCER.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1]	77	13·0	31	4·9	83	14·0	129	21·6	54	9·1
	[2]	434	12·1	183	5·06	583	16·5	734	20·5	311	8·7
Actual Deaths and Rate per 10,000	[1]	69	11·6	39	6·3	79	13·3	101	17·0	63	10·6
	[2]	478	13·3	212	5·86	589	16·63	656	18·3	362	10·1
Difference from Mean	[1]	− 8	−1·4	+ 8	+1·4	−4	−0·7	−28	−4·6	+ 9	+1·5
	[2]	+44	+1·2	+29	+0·8	+6	+0·13	−78	−2·2	+51	+1·4

[*] NOTE.—The figures [1] denotes the data for June, [2] for year to date.

The five weeks ending 29th June 1901 were over all a little colder than usual, for which those ending on the 15th and 22nd were chiefly responsible. During these two weeks the day-degrees over 42° F. fell 33 per cent. below the normal aggregate. The rainfall, thanks to falls of 1·2 in. in the first and third of the five weeks, or 75 per cent. of the total, was considerably above the mean; the daily variability of temperature was under, while the hours of bright sunshine were nearly 25 per cent. over the average. For the week ending 8th June the hours of bright sunshine were as many as 75 per cent. above the number expected.

For the first half of the year the accumulated degrees of warmth over 42° show a deficit equal to 5·9 per cent. of the mean, those below 42° an excess of 7·3 per cent.; the rainfall 6 per cent. decrease, and the sunshine 13·1 per cent. increase, as to the respective averages.

These sunny weeks, although slightly lower in temperature than usual in June, were accompanied by a greatly decreased death-rate, equal to nearly 12 per cent. below the mean; contributed to by almost all classes of disease, save those of the urinary and circulatory systems and of cancer. Urinary causes yielded almost 26 per cent., cancerous causes nearly 16 per cent., and heart diseases 6 per cent. of increase over the average; while nervous causes, by 24 per cent., respiratory causes and phthisis, both by 24 per cent., yielded decreases.

Influenza was the direct cause of five deaths.

For the first six months of 1901 the total number of deaths registered was slightly under that expected; especially was this the case with regard to respiratory and nervous causes and to phthisis—13·2 per cent., 2·5 per cent., and 10·6 per cent. below their respective means. Deaths from digestive causes by 10·3 per cent., urinary by 15·8 per. cent., and cancerous diseases by 16·4 per cent. were in excess.

THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

THE Congress to be held in Cheltenham this year, on July 30 and following days, is expected to be on as large a scale, if not larger than it was at Ipswich last year.

The Council of the Association desired a meeting in the West of England, and approached the Gloucestershire Branch on the subject. A special meeting of the Branch was called, and at a large meeting it was unanimously decided to invite the Association to Cheltenham in 1901.

Following the precedent of last year, a number of the officers of the different sections have been selected from the members of this Branch.

The General and Sectional Meetings will be held under one roof, in the Cheltenham Ladies' College; and the Winter Garden will accommodate the Pathological Museum, and the Exhibition of Instruments, Drugs, Books, Foods, and, in addition, a goodly show of Carriages and Motor Cars. Under the same roof there is a large hall, which will be used for daily luncheons.

Cheltenham is a residential town, famous for its Schools. Cheltenham College educates boys for the different branches of the Army; it has also a strong Classical Department, and a good Junior School. It is well worthy of a visit, and no one should miss seeing its fine buildings, playgrounds, and the new chapel.

The Ladies' College, quite a small University in its way, will be seen to advantage during the different meetings of the week, with its half a dozen large halls and seventy rooms. The whole forms a beautiful Gothic pile, kept up like a palace, and enriched by many gifts of coloured windows and statues, commemorating many famous women. The buildings have been erected at various times since 1870, and have cost upwards of £70,000. Under its auspices close on 1000 girls are being educated, and it is one of the sights of Cheltenham to meet regiments of young ladies marching from all directions to College each morning.

Besides these two Colleges, the town boasts of its two large Church of England Training Colleges—one near St. Paul's Church, for 120 male students; and St. Mary Hall, accommodating 90 ladies.

The last and by no means least known School is that erected in memory of the late Dean Close, at one time Rector of Cheltenham, and a pillar of the Evangelical Party. The School with its fine Elizabethan architecture and magnificent playground, is situated in the western suburbs of the town, close to the Midland Station. More ancient than all the other Schools is the Grammar School, founded by the piety of Richard Pate in the reign of Queen Elizabeth. It still affords a sound classical and commercial education, and is accommodated in handsome modern buildings on the site of the old school.

Cheltenham first came into notice at the close of the eighteenth century and the early decades of the nineteenth century, owing to its mineral springs of saline waters, which are allied to those of Carlsbad. Their fame remains, but their medical use has been allowed to dwindle away, and a source of profit to the town is being steadily lost. Successive parties in the Corporation have tried to resuscitate them at various times, but want of means and the apathy of the ratepayers have so far prevented more than one good scheme being adopted and carried out.

The waters exist as of old, having the same properties, both chemically and therapeutically; they are still taken and appreciated by the working classes; and, to a limited extent, are prescribed by some members of the local profession, with marked and even noted success. They are useful for liver disturbances, congestions, and biliary affections, and are indicated in gouty affections of the skin and nerves, and are markedly useful in cases of pruritus senilis. Cheltenham has yet to learn that she has a valuable asset in the water under her feet, as well as in her great educational establishments.

The chief hospital of the town is the General Hospital and Dispensary, having seventy-five beds. Attached to the hospital is a comfortable Home for Private Nurses, and a new Operating Theatre has just been completed.

The Delancey Fever Hospital, governed by a Board of Trustees, on which the Corporation have representatives, is situated on the southern boundary of the town. It was founded by the late Miss Delancey, and large additions have been made at various times, through the munificence of private donors, chief among whom have been the late Rev. Y. Gabell and the late Charles Wilson, Esq. It has separate blocks for the accommodation of smallpox, scarlet fever, diphtheria, and typhoid, having both public wards and private rooms. It is supported to a large extent by the Corporation, and partly by subscription and payments of patients.

The smaller Hospitals are, the Home for Sick Children; the Eye, Ear, and Throat Hospital; and the District Nursing Association, which has a good Lying-in Ward and Operating Room, with accommodation for three patients.

The town of Cheltenham is spread over a very wide area. Its streets are wide and well sheltered, with many beautiful avenues of trees, chief among which is its Promenade, extending for three-quarters of a mile in the centre of the town. The town is surrounded from north-east to south-west by the Cotswold Hills, on the highest point of which—Cleeve Hill—are very extensive golf links.

The programme for the week commences with divine service in St. Matthew's Church at 11.30, conducted by the Rector, the

Rev. Canon Roxby, and the sermon will be preached by the Very Rev. the Dean of Gloucester, Dean Spence. In the evening the President, Dr. Ferguson, delivers his address in the Princess Hall of the Ladies' College.

The addresses in Medicine and Surgery will be given by Dr. Goodhart and Sir William Thomson.

The discussions in the various Sections will be full of interest.

In the Section of Medicine, Dr. A. E. Garrod will open a discussion on "Chronic Diseases of Joints commonly included in the terms Chronic Rheumatism, Osteo-arthritis, and Rheumatic Gout."

Dr. E. G. Reynolds of Manchester will open one on "Peripheral Neuritis in Beer Drinkers; its Precise Causation and Diagnosis."

In the Section of Surgery, Mr. Reginald Harrison will treat of "Renal Tension; its Treatment by Surgical Means." Mr. Gilbert Barling will introduce for discussion the subject of "Gastrojejunostomy in Ulcer of the Stomach and Duodenum, and in Pyloric Stenosis"; and Mr. Howard Marsh will commence one on "Injuries of Joints, with special reference to their Immediate Treatment by Massage and Movement."

The Section of Obstetrics and Gynæcology will take two subjects—(1) "The Causation, Prevention, and Treatment of Miscarriage"; and (2) "The Diagnosis and Treatment of Metritis, and its Relationship to Malignant Disease."

State Medicine will review "The Relations between County and District Sanitary Administration," a decidedly thorny subject. The second day will be occupied with "Enteric Fever; its Natural History (including Bacteriology, Modes of Dissemination, etc.), and Prophylaxis"; and on the third day "The Diseases of Occupations."

In Psychological Medicine, "The Rôle of Toxic Action in the Pathogenesis of Insanity" and "Puerperal Insanity" will be considered on the second day; and on Friday, August 2, Dr. Francis Warner will open a discussion on "Feeble-minded Children; Diagnosis and Treatment"; and to this discussion a certain number of well-known school managers and teachers will be invited.

Anatomy and Physiology have provided good material, Professor Christopher Addison of Sheffield taking "The Topographical Anatomy of the Thoracic and Abdominal Viscera, from a Systematic and Clinical Standpoint."

The second discussion is likely to be of extreme interest, as Dr. Pavy will speak on "Experimental Glycosuria," and be followed by Professor Vaughan Harley, Professor W. H. Thompson, Dr. A. P. Luff, Dr. R. Hutchison, and others.

The other Sections are equally well provided with papers and subjects for discussion.

Ophthalmology.—"The Diagnosis, Prognosis, and Treatment (non-operative) of Progressive Myopia"; "The Relation of Gonorrhœa to Diseases of the Eye (exclusive of Purulent

Ophthalmia)"; and "The Varieties and Treatment of After-Cataract," to be opened respectively by Messrs. Priestley Smith, J. B. Lawford, and F. Richardson Cross.

Diseases of Children.—"The Treatment of Intussusception," by Mr. Bernard Pitts; and "Early Diagnosis of the Acute Specific Fevers," by Dr. F. Foord Caiger.

The Sections of "Laryngology, Rhinology, and Otology," "Tropical Diseases," and "Navy, Army, and Ambulance"—all provide useful subjects for consideration.

In Dermatology there will be daily Clinical Demonstrations, a short Presidential Address; and on Wednesday, July 31, Dr. Sabouraud of Paris will open a discussion on "The Rôle of Staphylococci and Streptococci in the Etiology of Skin Diseases," illustrated by many lantern slides. Many of the papers this year in several of the Sections will be illustrated by lantern slides, in addition to drawings, specimens, and microscopic slides.

The Daily Journal, as usual, will keep the members posted up in the doings of the day.

For entertainment and relaxation, garden parties, daily trips to the hills and neighbouring towns, golf, and open-air concerts will be provided. To the lover of scenery, a climb up Cleeve Hill (from the top of which a view over eight counties can be obtained) will be as pleasurable as to the golfer who revels in its bracing and breezy atmosphere. To the geologist, its quarries in the inferior Oölite are a happy hunting-ground; and for the archæologist there is provided on this great hill a most interesting chapter of British and Romano-British history — barrow and camp and Roman wall occupying its summit.

By special invitation from Gloucester, Friday is to be occupied by a visit to its ancient city. Mr. Bellows will discourse on its early history, and will accompany a party over the interesting points of the city. Dr. Batten and Miss Batten will receive the members at the Guild Hall, and the Dean will personally conduct a party over its beautiful and stately Cathedral; while another large party will be entertained at Barnwood House by the Governors and Dr. and Mrs. Soutar. *Twelfth Night* will be performed as a pastoral play by Ben Greet's Company.

On Saturday, Cirencester and Lord Bathurst's Park will be visited; there will be a trip down the Wye, visiting Monmouth and Tintern; and a third excursion to Malvern, by special invitation of the Malvern District Council and Medical men. Tewkesbury, with its ancient Norman Abbey Church, old houses, battle-field, and the confluence of the Severn and Avon, can be visited daily.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

THE TUBERCULOSIS PROBLEM, AS AFFECTED BY THE BRITISH CONGRESS ON TUBERCULOSIS.

By R. W. PHILIP, M.A., M.D., F.R.C.P.Ed., *Assistant Physician Royal Infirmary; Physician Victoria Hospital for Consumption and Diseases of the Chest, Edinburgh.*

THE British Congress on Tuberculosis met in London during the last week of July. This is the first great concerted meeting held in this country for the special discussion of the various aspects of tuberculosis. On that account the Congress was of peculiar interest. It was a large meeting. There was a remarkable gathering of well-known workers and leading thinkers in this department of medicine, not only from most parts of His Majesty's dominions, but also from many other parts of the world. There was a considerable exchange of opinion on the various aspects of tuberculosis, and a number of important papers were communicated. The meeting was eminently successful.

The question is naturally asked—What is the net result of the meeting? Was any definite advance made in our knowledge of tuberculosis? Was any new ground broken? For what practical outcome may we look? It is the purpose of the following pages to strive to answer such questions.

Writing immediately at the close of the meeting, it is impossible to gauge fully and accurately all the results of the Congress. But something may be done in this direction by attempting to focus the opinions expressed on various topics, and to summarise the conclusions of the principal discussions. The unanimous opinion of the Congress on certain matters was voiced in the form of definite resolutions, which were adopted at the last general meeting, and to these reference will be made as we proceed. It must be kept in view, however, that these resolutions do not cover all the ground included in the discussions. In order to insure unanimity, many contested issues were necessarily excluded from the resolutions.

That the large and somewhat chaotic collection of material may be reduced to something like serviceable compass and order, I propose considering, as shortly as possible, in what respects and to what extent the deliberations of the Congress have affected our knowledge of—(1) The Pathology, (2) the Diagnosis, and (3) the Treatment, of tuberculosis.

I. PATHOLOGY.

If the Congress effects nothing more, it will have done good service by reiterating in the clearest fashion that the causes of tuberculosis are identical all over the world. Many of these etiological factors have been long recognised, but there is considerable room for fuller knowledge in many directions. Of the matters at issue, the following may be cited particularly:—

Soil and the seed.—These two factors in the etiology of tuberculosis—a suitable nidus and the implanted tubercle bacillus—are now recognised by all. The dual pathogenic relationship was kept well in view in the discussions.

The significance of suitable or prepared soil is admitted freely. But what does this mean? We are well agreed that hereditary tuberculosis, in the sense of direct transmission of the disease, is of so infrequent occurrence as to be a negligible quantity. Heredity in tuberculosis is limited to the transmission of a certain vulnerability or liability to inoculation. What such liability connotes is another matter. The question is a difficult one. Nor can it be said that any important conclusion was submitted to the Congress on the point. The Congress did in fact pass it on as a legacy to a succeeding Congress (to be held two years hence in Paris) in the following resolution—"That the following question be submitted to the consideration of the next Congress—'The constitutional conditions of the individual which predispose to tuberculosis, and the means whereby they can be modified.'"

If it be granted that some persons be born with tissues more susceptible to tuberculosis, it seems still more certain that susceptibility can be acquired through a large series of devitalising influences. On these much stress was justly laid in the consideration of preventive measures. The experience of the last fifty years has abundantly shown the dependence of tuberculosis on the existence of an unhygienic environment. Tuberculosis has thriven in the past because men were content to live, or permit others to live, in dark, sunless, airless, damp dwellings. Improvement in dwellings and work-places has been one potent factor in effecting the remarkable reduction in the mortality from tuberculosis by some 40 to 50 per cent.

Alcoholism as an etiological factor.—The relationship of alcohol to tuberculosis has long been a vexed question. Not a few able clinicians have maintained that alcohol is directly antagonistic to tuberculosis. Certainly many clinical facts may be cited in favour of the view that alcohol in moderation is distinctly serviceable in the treatment of the disease. Further, it may be recalled that alcohol in various forms has a distinct pathological relationship with gout, and there has been a strong pronouncement of opinion that gout is in some way antagonistic to tuberculosis.

The place of alcohol in the causation of tuberculosis received considerable prominence at the meeting. Professor Brouardel, in his general address to the Congress, went so far as to say that "alcoholism is the most potent factor in propagating tuberculosis." In judging of such a statement it is necessary to keep in view the effect of alcohol in the production of poverty and want, which are admittedly important factors in the production of tuberculosis. At the same time, Brouardel's statement is supported by the testimony of a considerable number of clinical observers. Experimentally, too, it would seem demonstrated that alcoholised animals are more easily infected by certain microbes than other animals, and that animals which have been treated chronically with alcohol are with greater difficulty than others rendered immune to infection. Apparently alcohol effects a negative chemiotaxis.

The matter is far from being settled. It must never be forgotten that, while an excessive dose of a potent drug may do harm to an individual, or even cause death, a suitably graduated dose of the same drug may prove a most valuable preventive or remedy, and even save a patient who without it must certainly have died. The probability is that here, as in many other questions, the truth lies midway.

Relations of human and bovine tuberculosis.—By far the most important issue was raised by Professor Koch. Indeed, Koch's contribution to the discussion of the pathology of tuberculosis may fairly be described as the event of the Congress. At first it seemed to take one's breath away. It made men ask whether there was any good in holding certain of the sectional meetings thereafter. But wiser counsels prevailed. It was felt that, if perhaps Koch's contribution might have been better presented to one of the sections rather than to a public meeting, nevertheless only good could follow the throwing down of the gauntlet on so vastly important an issue by the leading authority on tuberculosis.

Without affirming that they are certainly distinct, Koch throws grave doubt on the identity of human and bovine tuberculosis. It appears that he has always been sceptical as to their identity, but till recently had not sufficient facts to warrant his asserting the contrary. He lays considerable stress on the difficulty of attempting to settle the matter by experiments on small animals, *e.g.* rabbits, guinea-pigs. He bases his present view on experiments with cattle, conducted during the past two years along with Professor Schütz of the Veterinary College in Berlin.

The experiments were as follows:—Two series of young cattle, which had all stood the tuberculin test, and were therefore presumably free from tuberculosis, were inoculated in various ways (by feeding, subcutaneous, intraperitoneal, and intravenous injection and inhalation) with cultures of tubercle bacilli and other tuberculous products, obtained in the first series from the human subject, and in the second series from cattle. None of the first series showed any symptoms whatever, and, when killed six or eight months after inoculation, presented no evidence of tuberculosis. (At the points of inoculation a few tubercle bacilli were found. Cf. results of injecting dead tubercle bacilli.) The second series fared very differently. In every case the gravest symptoms developed in a week. Some of the animals died in a month or two, and others were killed in a miserable state in three months. On examination, after death, abundant evidence of widespread tuberculosis was present in every instance.

Corroborative evidence was obtained in relation to swine fed on tuberculous products (though it should be noted that among the swine fed with sputum there were found "here and there little nodules in the lymphatic glands of the neck, and in one case a few grey nodules in the lung"), and also in relation to asses, sheep, and goats, inoculated by injection. Koch further cites corroborative evidence from previous experiments of Chauveau, Günther and Harms, Bollinger, and others, and recent investigations in North America (Smith, Dinwiddie, and Frothingham).

The evidence thus marshalled has appeared to Koch to justify his maintaining that human tuberculosis cannot be transmitted to cattle. It should be noted, however, that, while personally convinced, Koch speaks with generous frankness in the matter, and desiderates an independent repetition of the experiments, in order that all doubt may be removed. The wish is coupled with the announcement, that already the German Government has appointed a Commission to inquire into the subject.

The other side of the issue is of still more practical significance. How does the human subject comport itself in relation to bovine tuberculosis? In forming conclusions as to this, it does not seriously matter whether human and bovine tuberculosis are identical, or whether cattle are susceptible to human tuberculosis. The question is—Is the human subject susceptible to bovine tuberculosis? Here Koch's evidence is chiefly negative and less convincing. He emphasises the extreme rarity of primary tuberculosis of the intestine—a condition which, having regard to the abundance of bacilli in milk, butter, and other products, ought, he thinks, to be common if the human subject be truly susceptible. He quotes statistics from several authorities (Charité Hospital, Baginsky, Biedert) in support of the view. He suggests that even the rare cases of primary lesion may have resulted from bacilli of human tuberculosis, which had entered the digestive tract by swallowing saliva and other secretions. He recommends inoculation experiments in cattle, with pure cultures reared from the tuberculous material obtained from human primary intestinal lesions, with a view to clearing up the point. The results he has himself obtained so far in this direction have been negative.

While speaking with a certain amount of reserve on the point, Koch concludes that if the human subject be at all susceptible to bovine tuberculosis—a point not yet absolutely decided, in his opinion—the susceptibility is not pronounced, and " the infection of human beings is but a very rare occurrence." As we are at present concerned with the pathological aspect of Koch's thesis, I refrain from reference to the practical results to which Koch's conclusions lead. These will be considered later.

For the moment we are concerned with the justness of Koch's pathological position. It is to be kept in view that he himself does not affect absolute certitude in the matter. It is on this account that it appears to me that it would have been better had the announcement of his important conclusions taken the form of a communication to one of the sections, where free discussion would have been possible.

Even regarding the first half of his thesis, where his experimental proof seems so conclusive, Koch courts further inquiry. His results are admittedly opposed to those recorded by previous observers, in relation to the inoculation of smaller animals with products from both human and bovine tuberculosis. But then, as has been pointed out, Koch regards such experiments as fallacious. It is a pity perhaps that he did not in this connection indicate more definitely what grounds he had for regarding these as unreliable.

It is just conceivable that the potency of bovine tuberculous virus may be so diminished in its passage through the human subject as to produce the semblance of a different reaction from that produced by bovine tuberculous virus when conveyed directly from cattle to cattle.

The results obtained in connection with the tuberculin test, equally in the human subject and cattle, would suggest further room for doubt, as the commonly used tuberculin is obtained from human tuberculosis. Here again Koch maintains that the contradiction is rather apparent than real. He cites analogous reactions in relation to other allied microbisms, as for example the agglutinising action exerted by the serum of typhoid patients on other bacilli besides the *Bacillus typhosus*, the reaction being not limited to an individual, but common to a group.

Regarding the second half of this thesis, namely, that bovine tuberculosis is not communicable to man, Koch himself admits that the last word has not been spoken. The evidence he adduces

—negative at the best—is opposed by similar kind of evidence from other hospitals, *e.g.* the Great Ormond Street Hospital for Sick Children (Still), and the Edinburgh Royal Hospital for Sick Children (Shennan), at both of which, after careful computation of a large number of cases, the percentage of primary tuberculosis has been estimated at little short of 30—a very considerable proportion indeed.

Even if the infrequency of primary intestinal affection were granted, the argument would seem less effective in favour of Koch's position than he appeared to admit. For it is reasonable to conceive that, from various causes, human tubercle bacilli are frequently enough swallowed by persons not otherwise infected, and so reach the intestine. If this be so, the rarity of primary intestinal tuberculosis might be cited as evidence against the communicability of human no less than bovine tuberculosis.

Further, it would seem to be beyond doubt that veterinary surgeons and others have, in no inconsiderable number, become infected with tuberculosis, from injury obtained at post-mortem examinations of cattle infected with tuberculosis. This fact is attested by the highest authorities (Nocard, Bang). It is also not irrelevant to bear in mind that bovine tuberculosis can be communicated to a great variety of animals (horse, dog, sheep, pig). Analogy from definitely ascertained facts in relation to other organisms would therefore suggest a presumption in favour of its communicability to man too.

Admittedly, then, the issue is far from determined. It must be considered for the present as *sub judice*. Accordingly, it is satisfactory to note that the Congress in general meeting unanimously passed the following resolution:—"That, in view of the doubts thrown on the identity of human and bovine tuberculosis, it is expedient that the Government be approached and requested to institute an immediate inquiry into this question, which is of vital importance to the public health, and of great consequence to the agricultural industry."

It is earnestly to be hoped that the Government will see their way to take action, and it is gratifying to learn that Germany has already moved vigorously in the matter. It is worthy of prominent record that, immediately on the publication of Koch's statement, two generous offers of private help were volunteered. Sir James Blyth, Bart., has expressed his readiness to make his large model farm in Essex available for competent experiments in relation to the question. Mr. Harold Swithinbank has similarly offered the use of his private laboratory, where already much work on tuberculosis has been carried out.

Variations of tubercle bacillus.—What are the distinctive characters of the tubercle bacillus? What variations of the tubercle bacillus occur? How is it related morphologically and tinctorially to other organisms? Those and other interesting questions were suggested by a visit to the Pathological Museum and by the trend of discussion. It was remarkable to observe the variety of appearance presented by cultures reared in various laboratories. In this connection the want of a standard culture medium was rightly emphasised.

Formerly an " acid-fast " bacillus of certain form was regarded as tubercle bacillus (the rare lepra and smegma bacillus being excluded). More recently it has been shown that very young tubercle bacilli are not thus resistant to acids. Further, it has been demonstrated that organisms, resembling the tubercle bacillus in form and similarly acid-fast, occur in the environment of men and animals. Thus Petri and Rabinowitsch separated such a bacillus—not the tubercle bacillus—from butter (known now as the Petri-Rabinowitsch butter bacillus). Similarly, Moeller has cultivated a bacillus which he discovered on timothy grass—the Timothy bacillus—which closely resembles, morphologically and tinctorially, the tubercle bacillus. He has further described a manure bacillus obtained from manure heaps, which likewise much resembles the other organism. It would seem proved also that the tubercle bacillus, when passed through cold-blooded animals (*e.g.* fish, slow worm) affords cultures resembling those of avian rather than human tuberculosis.

These are most interesting, if somewhat disconcerting, observations, and raise considerable doubt as to the significance of mere microscopic determination of the tubercle bacillus. Apparently the results of inoculation afford more reliable grounds of distinction. Even here the examination requires considerable care, as, macroscopically at least, the aspect of pseudo-tuberculosis may be highly suggestive of true tuberculosis. There would seem to be much room for further observations in this direction.

Variations of tuberculosis.—The great variety of manifestation presented by tuberculous disease has been frequently remarked. In explanation of this, two factors must be kept in view—

1. The character and activity of the organism.—Tubercle bacilli seem to vary much in virulence, as do other pathological organisms. This effects much variation in pathological manifestation. In like manner the varying degree of resistance offered by different tissues and different individuals, plays an important part.

2. The channel of dissemination.—Tuberculosis is extremely slow in progress, when there is no available outlet for dissemination (*e.g.* in lymphatic glands). When the spread of disease occurs by continuity only, the progress remains relatively slow. Local metastasis is readily effected through the lymphatic circulation and epithelium-lined passages (bronchi, intestine, ureters), the progress necessarily varying in different instances. More distant metastases are effected by the blood stream. These may take the form either of a rapid general dissemination of tubercle, or isolated metastatic foci may result. The latter occur oftener than might be supposed.

Remarkable irregularities are found in respect of the frequency of involvement of various organs. Thus, the stomach is rarely affected by tuberculosis. The pericardium, while not seldom affected, would seem to possess a certain exemption, considering the extreme frequency and abundance of tuberculous deposits in lungs and pleura. In relation to epithelium-lined passages, an interesting question emerges—Whether the mucous membrane permits the passage of the bacilli without themselves becoming tuberculous, while the bacilli which have passed through infect the underlying glands? There seems no reason to doubt this. A number of facts point to the conclusion that such a process occurs in relation to the bronchial and gastro-intestinal passages.

Mixed infection.—There is much need for clearer and fuller knowledge regarding the part played by other organisms in the course of tuberculosis. There is abundant room for observation, both pathological and clinical. Although several interesting communications were made to the Congress on the subject, it cannot be said that much fresh light was thrown on the matter.

If in some quarters too little attention has been paid to the influence of auxiliary organisms in connection with tuberculosis, it may be feared that sometimes too great prominence has been given to the part played by mixed infection in the progress of the disease. One must keep in view, on the one hand, the fact that without the tubercle bacillus there can be no tuberculosis; and, on the other, the rapidity and certainty with which the tubercle bacillus, when widely disseminated, can effect death. The tubercle bacillus is far from being the benign organism which some speakers on the subject would suggest. At the same time there can be no doubt that the addition of other microbes—notably the *Streptococcus pyogenes*, *Staphylococcus pyogenes aureus*, *Staphylococcus albus*, and *Diplococcus pneumoniæ*—plays an important rôle in the pathological process. These, and other organisms, are readily found in the carefully rinsed expectoration and in the lung tissues of certain tuberculous patients. Such organisms have admittedly a detrimental influence both locally by devitalising, and systemically through the production of toxæmia. It cannot be granted, however, that we are yet in a position to say definitely how much of the local disturbances (inflammatory and ulcerative), or how much of the constitutional disturbance (pyrexia and the like), are traceable to the auxiliary organisms as opposed to the *B. tuberculosis.*

II. DIAGNOSIS.

The early diagnosis of tuberculosis is of first moment. The statement seems a truism. Yet everyday experience suggests the urgent need of its reiteration. The statement was reiterated and abundantly illustrated by many contributions to the Congress.

Diagnosis must, in most cases, proceed on well-recognised classic lines—symptoms, physical signs, pulse, temperature, weight, state of other organs, history, determination of tubercle bacillus, etc. The possibility of tuberculosis should be conceived in every case when an individual remains out of tone or goes off colour, even if definite symptoms of local disease be wanting. Too many cases are missed at the date of infection, because of inattention to such indications.

The attention of the meeting was especially directed to three more specialised methods of diagnosis—(1) *Tuberculin reaction*, (2) *Röntgen ray illumination*, (3) *Serum reaction*.

(1) *Tuberculin.*—It was satisfactory to observe the comparative unanimity expressed as to the value of tuberculin in diagnosis. Quite a number of independent observers testified to this (Koch, Heron). Since its introduction in 1890, I have made regular use of it in the relatively small group of cases where determination by other methods proved insufficient. The results have proved uniformly satisfactory. In no case has inconvenience been experienced. Like every other potent drug, tuberculin must be used with knowledge and caution; but with this proviso—it may be used fearlessly.

It is wise to proceed slowly. Small doses are to be recommended. Thus, I have been in the habit of commencing with from $\frac{1}{5}$ to 1 mgrm.—in more delicate patients even less. The original tuberculin seems on the whole preferable. In view of the extreme significance of early diagnosis, so sure a means of determination cannot safely be neglected. The cases in which bad results have been recorded have been extremely few—fewer perhaps than that in relation to any other similarly potent drug.

(2) *Röntgen ray illumination.*—Several papers on this subject were communicated to the Congress. These endorsed the view that "illumination by Röntgen rays may afford valuable corroborative evidence. Especially is this true in relation to early stages of the disease. Even when physical signs, in the ordinary sense, are slight—some would say when they are wanting—involvement of lung may be testified to by the shadow on the screen or the radiograph. In estimating the diagnostic value of the Röntgen rays, much depends necessarily on the relative skill of observers in the use of different methods. It is astounding how apparently obvious physical signs may be passed over by good observers. It is therefore difficult to compare rigidly the results determined by the earlier physical methods and those obtainable by the Röntgen ray method. None the less is it true that Röntgen ray illumination affords important aid. For definitely recording the amount of opacity, the radiograph is most serviceable. The simple screen has advantages in other directions. While showing the shadow sufficiently well, it reveals insufficiency of diaphragmatic movement on one or other side. Thus, in early pulmonary tuber-

culosis, the diaphragm stands unduly high and its excursion is limited."[1]

Without discussing technical details, it may be well to add that an exposure of one or two minutes of the patient seems sufficient for all practical purposes, and that no bad results have followed so short an exposure.

(3) *Serum reaction.*—Remarkable diversity of result has been recorded in relation to the serum method of diagnosis. Arloing has pursued this method for several years — since 1898 — and believes that the results obtainable are trustworthy and satisfactory. Using a homogeneous culture of Koch's bacillus in glycerinated broth—selected for the purpose—he finds, in the case of cattle, that while the serum of healthy adults agglutinates, and very often clears, when of 20 per cent. strength, it fails to do so when of 10 per cent. On the other hand, the serum of tuberculous adults, with rare exceptions, agglutinates and clears completely when of 10 and 5 per cent. strength, and sometimes below that. In relation to the diagnosis of surgical lesions, he states that he was able to obtain positive results in 74·5 per cent., while only 25·5 per cent. of the clinically tuberculous cases gave a negative result. His observations were corroborated by other French observers (Courmont, Buard). This would tend to the belief that the reaction affords a readily available method of diagnosis. Unfortunately the results are considerably prejudiced by the experience of other observers (Rabinowitsch, Horton Smith), who found that a positive reaction was not certain in more than 10 to 12 per cent. of cases tested.

III. TREATMENT.

(A) PREVENTIVE MEASURES.—A distinction must be drawn between preventive measures which may be carried out voluntarily and preventive measures to be enforced by enactment. The attainment of the former may be effected by the circulation of suitable instructions. For the attainment of the latter, a strong public opinion must be created. We shall succeed in getting the required enactments when we succeed in getting the people to demand them. This is one of the collateral advantages of such a meeting as the recent Congress, which was not a gathering of doctors merely, but admitted to its membership every one sufficiently interested in the subject to go to the trouble and expense of joining. In addition to medical and veterinary representatives, the Congress received delegates from various Local Authorities (Municipalities, County and Parish Councils) and other public bodies. It may therefore be reasonably supposed that these public bodies have been officially informed, as perhaps never before, regarding the mature judgment of admitted authorities on the questions at issue. It remains to be seen how far Local Authorities are prepared to avail themselves of the large powers which, so far as several of the points are concerned, they undoubtedly possess already.

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[1] "Tuberculosis of Lung," "Ency. Med.," vol. vii. p. 119.

General hygienic measures.—Attention was abundantly drawn to the significance of these in relation to the prevention of tuberculosis. The necessity for increase of sunlight and air in relation to dwellings, work places, and other buildings, was emphasised. It was generally agreed that the inspection of lodging-houses, work-places, factories, offices, places of assembly, and public conveyances—cabs, omnibuses, railway carriages, etc.—should be more efficiently carried out. Professor Brouardel traced the marked diminution in the mortality from tuberculosis to the various enactments passed in England during the last seventy years. This seemed a more reasonable deduction than that of Professor Koch, who related the diminished mortality more especially to the erection of consumption hospitals in the country.

The views of the Congress found expression in a resolution, passed unanimously in general meeting, which, if perhaps a little thin and flabby, may serve to draw attention to the subject: "That, in the opinion of this Congress, overcrowding, defective ventilation, damp, general insanitary conditions in the houses of the working classes, diminish the chance of curing consumption, and aid in predisposing to and spreading the disease."

Indiscriminate spitting.—There was no dissension from the accepted opinion, once more voiced by Koch, that the main source of the infection of tuberculosis is the sputum of consumptive patients. This is so generally recognised that little need be said in the matter. But it is significant to note that other countries are ahead of us in its practical application. In our own Colonies, at Sydney, a fine of £1 is imposed on persons for spitting in the streets. In certain parts of America, legal enactments against it exist. Only recently an American millionaire, on repeating the offence, after being fined, was sentenced to twenty-four hours imprisonment. It is only right that expectoration on the streets and in public conveyances should be branded and treated as a nuisance. It should be borne in mind, however, that in order to make this possible, suitable provision (spittoons) ought to be arranged in public places, as in respect of other kinds of nuisances. Railway companies and other public carriers of passengers ought to be compelled to provide suitable accommodation in carriages or other conveyances, waiting-rooms, etc. The time has gone by for leaving such provision to the judgment of managers and hirers.

The Congress resolved: "That tuberculous sputum is the main agent for the conveyance of the virus of tuberculosis from man to man, and that indiscriminate spitting should therefore be suppressed."

It was further resolved: "That it is the opinion of this Congress, all public hospitals and dispensaries should present every out-patient suffering from phthisis with a leaflet containing instructions with regard to the prevention of consumption, and should supply and insist on the proper use of a pocket spittoon."

To some of us such a resolution may seem a little belated. In connection with the out-patient department of the Victoria Hospital for Consumption, Edinburgh, carefully printed instructions of this sort have been circulated widely for eleven years, and suitable regulations have been enforced in relation to spittoons. Doubtless other hospitals have acted similarly. It is certainly high time that the custom should become general.

Consumption hospitals and dispensaries.—For many years I have urged that "the public health department of a city or town should be prepared to receive and afford information and assistance in respect of tuberculosis. This should include the establishment of a hospital for the reception and treatment of the more advanced cases, at least among the poorer classes; and a dispensary at which the consumptive poor should be entitled to apply for advice and treatment. Means should be available for attendance on bedridden patients, not otherwise attended, at their own homes when hospital accommodation was not available. The department should issue and circulate printed instructions regarding prevention and disinfection. It should undertake the disinfection of bed-clothes and garments, and of all rooms occupied for long periods by consumptive patients, either after removal or death. It should undertake the examination and reporting on all suspected expectoration and other discharges. It should require immediate intimation from the district registrar regarding deaths from tuberculosis within the area concerned. Provision ought to be made in all asylums, poorhouses, and similar institutions for the separation and suitable treatment of patients suffering from pulmonary tuberculosis."

It was with a view to the practical elaboration of such an anti-tuberculosis organisation that the Victoria Dispensary was established in 1887. Through its extensive out-patient department, its house-to-house visitation, and, more recently, its hospital, much of the work recommended by the Congress has been initiated. The Congress had submitted to it most interesting reports in relation to the work effected by similar dispensaries recently established in Paris and Lille (Calmette).

It is significant to find that the Congress resolved: "That, while recognising the great importance of sanatoria in combating tuberculosis in every country, the attention of Governments should be directed towards informing charitable and philanthropic individuals and societies of the necessity for anti-tuberculous dispensaries, as the best means of checking tuberculous disease amongst the industrial indigent classes."

Although it does not appear in the formal resolutions of the Congress, it should be added that a strong feeling was expressed at more than one of the sectional meetings in favour of the provision of separate blocks or pavilions in connection with general hospitals for the reception of tuberculous cases. So long as it is practically impossible for a general hospital to exclude tuberculosis, it is highly desirable that provision be made for their isolation. What applies to general hospitals would seem to apply with no less force to asylums, poorhouses, and the like. In relation to hospital provision, perhaps more stress might advantageously have been laid, from the preventive point of view, on the necessity of providing first for more advanced cases of tuberculosis.

Reference to the desirability of sanatoria will be made later in speaking of curative measures.

Milk and meat supplies.—If Koch's contention be right, and the human subject be little, if at all, susceptible to infection from cattle, our scheme of preventive measures would be much simplified. Notwithstanding Koch's address, however, there was much discussion in more than one section regarding the nature and limits of preventive measures. The almost universal feeling was that, however the pathological question should be finally decided, the present was not a fitting time to propose any relaxation of existing regulations in relation to milk and meat supplies. In keeping with this, it was unanimously resolved at the final general meeting: "That in the opinion of this Congress, and in the light of work that has been presented at its sittings, medical officers of health should continue to use all the powers at their disposal, and relax no effort to prevent the spread of tuberculosis by milk and meat."

Notification.—Some of us have felt for long that notification of tuberculosis—especially pulmonary tuberculosis—afforded the only sound and logical solution of the tuberculosis problem. But so much has been made of the disadvantages and hardships which it was thought would accrue to the individual concerned, that it has been impossible to get the necessary machinery put in motion. I have always maintained that these disadvantages were unnecessarily exaggerated. The question is, Is notification likely to assist the authorities in dealing effectively with the disease which is responsible, in the United Kingdom, for 60,000 deaths per annum. If, as many of us believe, that question must be answered in the affirmative, there can be no valid reason why notification in some form should not be insisted on.

The Congress had placed before it afresh the experience of New York, where in 1893 notification was *required* of cases of consumption in public institutions, and *requested* from doctors regarding cases in private practice. There were notified in 1894, 4166 cases; in 1895, 5818 cases; and in 1896, 8344 cases. The results were in every way so satisfactory that the Health Board of New York in 1897 proceeded to declare pulmonary tuberculosis infectious and communicable, and to *require* the notification of cases of consumption occurring in the city. The results have continued satisfactory (Biggs).

There was likewise submitted evidence from Norway, to the effect that on 1st January of the present year notification of tuberculous disease had been made compulsory throughout Norway. While the law had been in operation for too short a time to speak of preventive results, no complaint of any sort, in respect of inconvenience resulting from compulsory notification, had reached the directorate of the medical service.

There was further submitted evidence as to the working of a system of voluntary notification, as carried out in the city of Manchester (Niven, M'Dougall). In 1899 it was resolved that all cases of phthisis occurring in public institutions should be notified. In March 1900 an extension was made, whereby medical practitioners were invited to notify cases. The objects of the scheme of voluntary notification were as follows:—(1) To educate members of the affected household more definitely as to the disease; (2) to carry out necessary measures of disinfection; (3) to collect data for further action; (4) to maintain, so far as possible, supervision over consumptives, in order to secure the application of precautionary measures; (5) to provide for bacteriological examination of sputum when necessary; (6) to further the introduction of proper hospital treatment. So far as could be gathered, a large amount of useful information had been obtained in relation to all those points, and no inconvenience had been experienced in carrying out the system. The experience of voluntary notification at Brighton (Newsholme) had been likewise satisfactory.

The Congress resolved unanimously: "That the voluntary notification of cases of phthisis, attended with tuberculous expectoration, and the increased preventive action which it has rendered practicable, has been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which efficient sanitary administration renders it possible to adopt the consequential measures."

International co-operation.—Nothing was more remarkable in relation to the meeting than the large attendance of responsible representatives from different countries. Two of the leading addresses were delivered by these. Others took a prominent part in the discussions, and communicated important papers to the various sections.

It was felt that the present was a fitting opportunity to attempt something like an international concert, in order to insure a still larger success. Accordingly, the Congress recorded its opinion, "that a permanent International Committee should be appointed to collect evidence and report on measures adopted for the prevention of tuberculosis in different countries," and to carry out other work towards the same end.

(B) CURATIVE MEASURES.—Having regard to the accepted dual etiology of tuberculosis—the prepared soil and the invading organism—the trend of modern therapeutics has likewise been twofold. The aim of rational therapeutics is—(1) To improve the resistant powers of the tissues; (2) to attack the tubercle bacillus (including its products and adjuvant organisms).

At the session of the Congress, if nothing of striking novelty in the way of treatment was communicated, most excellent work was done in the direction of clarifying and fixing medical opinion as to the best line of procedure.

Climate.—There has been evident a growing feeling that the influence of climate in the treatment of tuberculosis has been overestimated in the past. No one doubts that certain climatic influences act favourably. But the favourable result is less dependent on anything inherent in the *particular* climate than was formerly supposed. Much, therefore, of the attempted classification of climates, in respect of suitability for different types of cases, may be set aside as artificial and comparatively valueless.

The more rational position is undoubtedly that the best climate for the particular case is that which permits or induces the patient to be most in the open air. The selection of climate, therefore, should be governed by a number of considerations apart from the actual disease. It cannot be too clearly recognised, by doctors and patients alike, that as tuberculosis occurs in every climate, so it can be prevented and cured in every climate, if rational measures be enforced. For the majority of individuals it is most advisable that cure be obtained in the climate to which they are accustomed, and in which, after cure, they must live. In the lengthy discussion on climate at the Congress, while interesting information was afforded as to the success of treatment in this and that climate, notably in relation to high altitudes (Williams), the feeling was pretty generally expressed, that a special curative influence which had been attributed to certain climates could not be maintained, and that climate, as such, played a secondary part in the cure of the disease.

Sanatorium régime.—The rational or physiological treatment, as formulated in so-called sanatorium treatment, has been steadily growing in favour. There was a remarkable unanimity of feeling that the system—by whatever name it was called—is not only sound in principle but justified abundantly by results.

To cope with a disease which, far from being limited to the lung or any one organ, prejudices the patient's constitution in innumerable ways, it is in most cases necessary to insure, for a time at least, constant skilled surveillance. While the essential of the treatment is the hyperaeration of the patient, day and night, careful regulation is necessary in respect of rest, amount of activity permissible at various stages, dietary, skin hygiene, mental and physical occupation, and the like. In most instances, the adaptation of the system to individual patients can only be efficiently carried out either in a sanatorium or under the guidance of doctors and nurses who have had practical experience of the methods.

As to the site of the sanatorium, there was a strong feeling that it was possible, and in many respects desirable, to have sanatoria—especially for the poorer classes—at no great distance from their ordinary residence. Thereby the patient and the public generally become instructed that the prevention and cure of the disease are possible at their own door.

As to the length of residence in a sanatorium, much must depend on the individual case and the progress made in treatment. But it was generally recognised that the treatment must be a prolonged one, and that some of the disappointment which had followed in particular cases was due to unwillingness or inability to carry out the system sufficiently long. As to actual duration, six months were cited as forming in most cases a desirable minimum.

As to results, there was a unanimous verdict to the effect that, if treatment was only commenced sufficiently early, it would prove almost certainly successful. Even in the worst cases marked amelioration followed, and practically in no case did harm accrue.

The provision of sanatoria for the poor and artisan class occupied a considerable share of attention. It was generally admitted that their establishment in relation to every centre of population was eminently desirable. The Congress resolved: "That the provision of sanatoria is an indispensable part of the means necessary for the diminution of tuberculosis."

Some difference of opinion was expressed as to the means for their establishment and maintenance. It appeared clear that the German method, whereby funds for the maintenance of workmen's sanatoria are chiefly derived from a system of compulsory insurance against illness, could not be established in England. To this point Mr. Brabrook, chief Registrar of Friendly Societies of Great Britain, spoke with much definiteness. This means that the establishment of sanatoria must depend on public funds and private benevolence. It was kept in view that the individual, while perhaps unable to pay the entire cost of treatment, might reasonably be expected, in many instances at least, to contribute a moderate sum thereto. If the individual cannot contribute, owing to his reduced circumstances, perhaps an arrangement might be possible with certain of the Sick Societies, or the help of private friends might be available. There was a general feeling that the problem was too large for private benevolence only. It will doubtless be found desirable, in the development of sanatoria during the next few years, to take advantage of these several means for their provision and maintenance.

The *after* life of patients who have recovered sufficiently to admit of discharge from sanatorium treatment, becomes one of pressing moment. While important in relation to all classes, this is especially true of patients belonging to the working classes. With the enormous demand for accommodation, it is practically impossible to retain all patients for a sufficiently long period to insure complete recovery. It is peculiarly disappointing to find that persons who have made a good recovery, and retained recovered ground for months or longer—indeed, so long as they could maintain the physiological life—tend to slip back, because, by force of habit or necessity, they fall from the physiological life.

It was in view of the tendency to such declensions that some years ago I ventured to point out the desirability of establishing some system of *tuberculous colonies,* where convalescent and convalescing patients might each contribute by suitable work, according to physical capacity, towards the common good, remaining the while for his own benefit under suitable medical superintendence. The colony would become a training school for a variety of out-door occupations, which, after due probation, would afford a means of livelihood to the individual. The necessity of some such arrangement was accentuated by several physicians.

The establishment of sanatoria for tuberculous children, more especially at the seaside (Weber), was warmly advocated.

Dietary.—There was rightly evinced some feeling against the doctrine of "forced feeding." It was maintained that the term is misleading, as generally understood. If other indications are fulfilled, it is only in exceptional cases that any approach to forced feeding is found necessary. In most cases the appetite is quickly recovered, and gastro-intestinal disturbances fall into the background. Where anorexia and alimentary debility persist, each case requires special consideration, and no routine system of packing can be wisely sanctioned.

The value of a raw meat dietary—of which there can be no doubt—was again attested by several communications, based both on experimental and clinical observation. The remarkable benefit which is traceable in many instances was attributed by some to an antitoxic influence, and by others to reduction in the alkalinity of the blood.

Tuberculin.—Of specifics for attacking the bacillus more directly, tuberculin alone received serious consideration. In a discussion before the combined medical and pathological sections, Koch reiterated his earlier view as to its therapeutic efficiency. He has no doubt that, in early uncomplicated cases, it is of great value, and when used in such cases a complete cure frequently follows. If tuberculin is used in somewhat advanced cases, it is desirable, in order to obtain the full value of the tuberculin, that the temperature be normal before the injections are begun. It is generally necessary that the treatment be maintained for a considerable period, with intervals of from three to four months, until the injections cease to effect a reaction.

While more than one observer spoke with distrust of the remedy, there was a general expression of opinion, both from the experimental and clinical side, that tuberculin, when used with knowledge and due care, exerts a specific curative action, and its use is not attended by serious risk. After continued use of tuberculin in selected cases, during the past ten years, I am bound to say that I share the latter view. Its mode of use and limitations doubtless require elaboration. Perhaps the remedy may be refined or further modified. It is certainly desirable that it be standardised. But, in presence of accredited observations, we cannot afford to set it aside as discredited.

In relation to treatment generally, there was a pleasing absence from the Congress of attempts to press any one remedy or any one method as certainly curative, to the exclusion of others. There was a remarkable paucity of novelties in treatment. No less striking was the sparing reference made to certain drugs which have from time to time been vaunted over much. There was refreshing evidence of a recognition, that the successful treatment of tuberculosis must proceed on eclectic lines, and that, because the morbid manifestations are highly complex, we must be prepared to select and combine the best methods of attack.

ON THE GRAVER COMPLICATIONS OF CHRONIC PURULENT OTITIS MEDIA.[1]

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I am the more honoured by the request of your President to read a paper before you this afternoon, since it is only four years since I had the pleasure of performing a similar function. It has occurred to me that, as a general surgeon who has for several years had charge of the aural department at a large hospital, and has therefore had a somewhat extensive and varied experience of the accidents that may follow suppurative aural disease, I might with advantage occupy the time at my disposal by addressing a few remarks to you on the subject of the consequences and complications of chronic purulent otitis media. In so doing I will confine myself entirely to those morbid conditions which have come under my own observation, and will not attempt any detailed account of every possible complication. Though I shall have to refer to several cases, I will do so as briefly as possible, in order to avoid wearying you with detail when I wish to direct your attention chiefly to principles.

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[1] An Address delivered before the West Surrey District, South-Eastern Branch of the British Medical Association, at Guildford.

And, to plunge at once into my contention, it is this. I am convinced that the vast majority of grave complications of purulent otitis media result from neglect of treatment of otorrhœa, and I say, without fear of contradiction, that the profession at large has much to answer for, in that medical men do not seem to realise the awful dangers to which patients, the victims of chronic purulent otitis media, are exposed. I am certain that I am well within the mark when I say that on an average I see, at least every fortnight, a patient whose life is in jeopardy, owing to some complication of purulent otorrhœa.

I shall mention the following complications of chronic purulent otitis media:—

(1) Aural polypi. (2) Purulent inflammation of the mastoid antrum and cells, including caseous and cholesteatomatous collections. (3) Paralysis of facial nerve. (4) Ulceration of blood vessels. (5) Meningitis. (6) Cerebral and cerebellar abscess. (7) Pyogenic lateral sinus thrombosis.

All these affections, with the exception of No. 4, I have had very frequent opportunities of observing. No. 4 I have fortunately only encountered on two occasions.

1. *Aural polypi.*—In the overwhelming majority of cases, aural polypi are caused by purulent otitis media. Aural polypi are (1) mucous, (2) fibrous, or (3) myxomatous—more than 80 per cent. belonging to the mucous variety. It is undoubted that more than 90 per cent. of aural polypi originate in the mucous lining of the tympanum. The polypus results from purulent otitis media, and, when once developed, tends to aggravate the purulent process by increasing and tending to dam back the flow of pus from the middle ear. Polypi are generally attended by a flow of fœtid pus often mingled with blood, and at times by neuralgic pains, tinnitus, giddiness, and attacks of vomiting, symptoms which are dependent, in large part, on the presence of a foreign body which offers an obstacle to the escape of pus from the middle ear.

Some writers attach importance to the differential diagnosis of aural polypi and granulations, but, except that the latter are commonly found in connection with caries or necrosis of the bony walls of the middle ear, this distinction is of no great moment, the treatment of the two conditions being in great part similar.

Aural polypi constitute a very serious disease, as they may occasion fatal troubles. Removal of the polypus is, of course, the treatment to be adopted, but it must also be considered as a somewhat hazardous procedure. In certain cases in which the bony roof of the tympanum is eroded, or in which there exists a congenital perforation, the polypus may practically spring from the dura mater, and pyogenic organisms from the suppurating middle ear may thus gain access to the interior of the cranial cavity, causing septic meningitis and death. This I have known to occur at least four times. It is wise, therefore, to purify as far as possible the cavity of the tympanum prior to attempting the removal of the polypus. The method I invariably adopt, and recommend to you with confidence, is the introduction into the ear, thrice daily, of a solution of biniodide of mercury, 1 to 3000, in rectified spirit, the affected ear being held uppermost for a few minutes. This solution, which for the treatment of purulent otitis media is invaluable, acts partly as an antiseptic, which penetrates as it does not coagulate the albuminous discharges, and probably more importantly as a dehydrant, attracting the watery elements of the polypus, which is thus rendered paler and shrunken This solution is even more valuable in the treatment of granulations. When the ear has been thus rendered as clean as possible, the polypus may be removed by cutting through its pedicle with a Wilde's snare, or by twisting with Toynbee's forceps. It is most important to destroy the root of the polypus after removal of the tumour, and this is best accomplished by touching it with the electric cautery, or with a tiny bead of chromic acid. It cannot be too forcibly impressed upon the operator, that so long as the polypus or granulation is intact, absorption is not likely to occur; but, when removed, absorption of pyogenic micro-organisms may take place through the open mouths of the vessels in the root or base of the tumour, and lead to fatal intracranial disease. To combat this danger, we rely on—(1) preliminary disinfection of the middle ear; (2) destruction of the raw absorbing surface left by the detachment of the polypus or granulation; and (3) the continued employment of the biniodide of mercury and spirit lotion, to prevent the recurrence of the polypi, by curing the purulent otitis media to which they owe their origin. For the removal of polypi, and, in fact, for most minor operations on the middle ear, almost complete anæsthesia may be obtained by the instillation into the external auditory meatus of a few drops of a 10 per cent. solution of cocaine hydrochlorate, in equal parts of anilin oil and rectified spirit. This valuable local anæsthetic solution we owe to Dr. Gray of Glasgow.

2. *Purulent inflammation of the mastoid antrum and mastoid cells, including caseous and cholesteatomatous masses, and necrosis and caries of the walls of the tympanum, mastoid cells, and antrum.*— Time will not permit of my giving the briefest description of the above morbid processes. I will therefore confine myself to the indications for opening the mastoid antrum in purulent otitis media.

In very acute inflammatory processes, when the temperature and pulse rate are high, the pain severe and radiating from the ear, the constitutional disturbance marked, and the purulent discharge either copious or arrested, with swelling and tenderness on percussion over the mastoid, and projection outwards and forwards of the auricle, every medical man would nowadays insist that the mastoid antrum be at once opened. The cases, however, in which there will be a difference of opinion are those in which there is only a moderate amount of purulent discharge without any very obtrusive symptoms. Here you will find surgeons who will advise, and practitioners who will decline to sanction, the performance of radical operations upon the mastoid. It is difficult to hold the balance fairly, the more so because, from external examination, it is frequently impossible to foretell the nature and site of the morbid processes in the recesses of the temporal bone. I think I may safely recommend operation upon the mastoid in the following cases, in which chronic otorrhœa is found in association with—(1) continuous or frequent pain in ear, mastoid, or side of head, particularly when such pains are aggravated by percussion over the mastoid process; (2) total loss of hearing, with frequent attacks of giddiness, suggesting purulent involvement or destruction of parts of the internal ear; (3) caries or necrosis; (4) polypi and granulations that recur after removal, and resist careful treatment with the biniodide and spirit ear drops; (5) caseous deposits and cholesteatomata; (6) facial paralysis, or paresis, which is so frequently due to caries or necrosis of the bony canal in which the nerve lies; (7) distinct symptoms of intracranial abscess, meningitis, or lateral sinus infective thrombosis.

In the above cases I would not hesitate to urge the advisability, nay even the necessity, of freely opening the mastoid antrum, clearing out the septic granulation tissue or inspissated pus blocking the cavities, and removing any carious or necrotic area of bone, and endeavouring to render aseptic the part by eradicating the products of inflammation from every nook and cranny.

It will be manifest that thorough exploration of the mastoid must be carried out before, or at the same time as, any operation for any intracranial complication of purulent otorrhœa, such as intracranial abscess, meningitis, or lateral sinus thrombosis. As Macewen points out, "to operate upon the several complications, and to leave uneradicated the paths by which pyogenic organisms enter, is to render the patient's recovery doubtful and to expose him to fresh attacks." Let me mention a case which forcibly illustrates the wisdom of this advice.

Case 1.—In May 1898 I was asked by a medical friend to see his only child, who was very drowsy, had double optic neuritis, ptosis of left eyelid, widely dilated immobile left pupil, weakness of right arm and leg, and a history of fœtid otorrhœa. I trephined the left temporo-sphenoidal lobe, and evacuated 14 drms. of thick greenish pus. The child's condition at the operation was so bad, and as I was operating with the assistance only of a nurse (the father, who was in a state of terrible anxiety, administering the anæsthetic), having found the abscess, I was content, and left the mastoid process to be explored in a few days' time under more favourable circumstances. The child made an excellent recovery from the operation, and though I urged that the *fons et origo mali* should be cleared out, the father firmly declined to have anything further done, as the child's condition was so satisfactory. After two years of apparent perfect health, the child died at school in France in 1900, and I was informed by the father that the cause of death was septic pneumonia, following infective lateral sinus thrombosis of the left side, the result of extension of purulent inflammation from the diseased mastoid. Had the mastoid antrum been explored at the time of or subsequent to the operation for cerebral abscess, the poor child would in all probability have been alive to-day.

3. *Paralysis of facial nerve.*—This condition is most frequently observed in connection with chronic purulent otitis media, though it may be met with in the acute variety and even in non-suppurative middle ear catarrh. The association is easily understood, when it is remembered that the facial nerve traverses the aqueduct of Fallopius, a bony canal, only separated from the mucosa of the middle ear by a thin and frequently perforated shell of bone. Frequently there coexists caries or necrosis of the aqueduct, but this is not by any means always the case. The facial paralysis may be complete or partial, and its course will depend upon whether the condition be caused by perineuritis, or be due to the pressure of exuded fluid upon the nerve as it lies in the unyielding bony canal, or to damage done to the nerve by diseased bone, or to ulcerative changes in the nerve itself. The prognosis of facial paralysis, secondary to ear disease, is, in general, fairly good, the large majority of cases unassociated with bony disease recovering completely as the result of treatment directed to the causal ear disease, generally purulent otitis media. Even in the worst cases, those dependent on disease of bone, recovery, complete or more frequently partial, may follow the extrusion of a sequestrum. I have very recently seen a case in which a considerable portion of the cochlea was cast off as a sequestrum, and in which, after six months of complete facial paralysis, a certain considerable amount of improvement has set in. Bilateral facial paralysis is rarely met with as a result of purulent otitis media. I have this year, however, seen an example of this condition.

4. *Ulceration of vessels.*—This is fortunately a very rare complication of purulent otitis media. I have only been consulted in two cases, of which in one only did I see the hæmorrhage. Both were due to caries or necrosis of some part of the petrous portion of the temporal bone.

CASE 2.—A child, æt. 13, who had been under treatment at the

Victoria Hospital for Children for purulent otitis media, was seized with sudden hæmorrhage from the left ear, venous in character. The mother declared that a tumblerful of blood had been lost. The house surgeon plugged the ear tightly with cyanide gauze, and kept the child under observation in hospital. Thirty-six hours later I removed the plug, as it was very foul; furious venous hæmorrhage ensued, requiring the insertion of another strip of gauze. Two days later this was removed, the hæmorrhage did not recur, and the child made a good recovery after the extrusion of a large sequestrum. The second case was in a man, æt. 47, whom I saw only shortly before he died of pyæmia. The history given me by his medical attendant was, that on examining the ear a sequestrum was found and extracted by him, with what he himself described as vigorous tugging, when alarming hæmorrhage occurred from some large vessel. It had recurred eight times in thirteen days. I could not discover from the medical man whether the hæmorrhage was venous or arterial, but I incline to think it came from the internal carotid. No post-mortem examination was allowed.

5. *Meningitis.*—The most fatal complication of purulent otitis media is purulent leptomeningitis, the form which attacks the pia mater and arachnoid membranes. In pachymeningitis the inflammation is more localised, and the dura mater is chiefly involved. The inflammatory process may extend inwards to the arachnoid and pia mater, but more frequently the three layers become glued into one, and firmly fixed to the brain, and in this way extension of the pyogenic infection is prevented. Purulent infection is conveyed from the middle ear to the membranes and to the brain, commonly through the often perforated roof of the tympanum, at which site, in all cases, the vascular communications between the ear and the membranes are very free; but it must be remembered that the inflammation may extend from the tympanum to the membranes or brain without the coexistence of any caries or necrosis of bone. The next most common place for the infection to pass inwards is through the inner wall of the mastoid antrum or cells. More rarely does the morbid process extend through the labyrinth and reach the interior of the cranial cavity by way of the internal auditory meatus.

The symptoms of purulent meningitis due to middle ear disease are frequently modified by the coexistence of abscess of cerebrum, cerebellum, or an extradural collection of pus. Commonly there are inflammatory changes in the cortex of the brain. The symptoms may commence with a rigor. Intense headache is found throughout the course of the disease. Vomiting, as in cerebral abscess, is frequent, and is unassociated with the taking of food. Constipation is common, and often there is retraction of the abdomen. The pulse is rapid, unless or until signs of compression begin to manifest themselves, when it commonly becomes very slow. The temperature is raised at the commencement, but this symptom I have found misleading. Purulent meningitis may be found in association with a normal temperature. Spasm and rigidity of the muscles of the back of the neck, with head retraction, are frequent. Localised spasms or paralyses, especially of ocular muscles, frequently aid in the diagnosis of meningitis, strabismus being very common. Optic neuritis is probably more often present than absent, but is a most uncertain sign. Pupils are frequently unequal and sluggish. There is at first undue irritability of the cerebral functions; thus delirium, restlessness, and photophobia, which soon give place to lethargy and coma. The duration of purulent meningitis is uncertain, the worst cases terminating in death in seventy-two hours; in other instances the condition may last a month to five weeks. Extensive purulent leptomeningitis is probably in all cases fatal, but it must be borne in mind that recovery frequently follows clearing out the mastoid cells and antrum and the middle ear in cases in which infective meningitis has been diagnosed by the most skilful observers. Probably, however, these instances are examples of meningeal congestion and irritation rather than of infective meningitis.

The following was an example of this:—

Case 3.—A young woman, general servant, was admitted into Charing Cross Hospital under my care in September 1894. She had suffered from otorrhœa for nine months from the left ear. Four days prior to admission she had two rigors, and had been in constant pain ever since. On examination, I found marked photophobia, blurring of optic discs, rigidity of muscles of back of neck and left muscles of mastication, and contraction of left pupil. The temperature was 102° F., and pulse 120. The left ear was blocked with inspissated pus and granulations. I diagnosed meningitis, but on opening mastoid antrum and clearing away much inspissated pus and granulation tissue, a small collection of pus, say 20 drops, was evacuated from a cavity between the dura mater and the perforated roof of the tympanum, forming an extradural abscess, and the patient made a rapid recovery.

Extradural abscess.—In inflammation of the outer layers of the dura mater, pus with granulation tissue tends to accumulate between this membrane and the bone, either on the roof of the tympanum or between the lateral sinus and the groove in the skull in which it lies. This condition may give rise to most urgent symptoms, as in a case upon which I operated for Drs. Hillier and Low at Stowmarket, or may produce no symptoms whatever, and be discovered only when operating for clearing out the contents of a foul mastoid, as happened a few days ago in a case in which Dr. Charles Fisher, the President's son, assisted me at the Victoria Hospital.

Except in so far as extradural abscess may be said to be an external pachymeningitis, I have nothing but a melancholy list of deaths to record in the cases of meningitis due to purulent otitis media. Very different has been the case with cerebral abscess and septic thrombosis of the lateral sinus.

6. *Abscess of brain.*—The successful treatment of abscess of the brain is one of the more recent triumphs of surgery, and this we owe to the great creator of cerebral surgery, Professor Macewen of Glasgow, to whose example I am indebted for the considerable measure of success with which I have been favoured in the treatment of intracranial abscess.

The great majority of brain abscesses owe their origin to purulent otitis media. Out of a hundred cases of brain abscess, secondary to purulent ear disease, 75 per cent. will be in the temporo-sphenoidal lobe, nearly 20 per cent. in the cerebellum, and in 4 per cent. two abscesses will be found, one in the temporo-sphenoidal lobe and the other in the cerebellum, and in almost every instance they will be found to have originated in old neglected otorrhœa.

Quite suddenly, and frequently from no other cause than the common and insufficient one of exposure to cold, urgent symptoms appear in a patient who has for months or years suffered from a chronic purulent discharge from the ear. Pain in the ear is felt for some hours, and then it extends to the side of the head, causing headache of great and frequently of unendurable severity. I have known patients to shriek in agony and plead for relief from their terrible sufferings. At first, generally more or less continuous, the pain tends in a few days to become less severe and less continuous, though it rarely entirely leaves the patient until either the abscess is drained or death ensues. Vomiting is very common, and may continue for days. It is unassociated with the taking of food. A rigor, or a sensation of shivering, is a very general early symptom, but repeated rigors are uncommon in cerebral abscess unless accompanied by infective lateral sinus thrombosis.

The temperature, at first slightly raised, becomes, as pressure symptoms develop, normal, or more commonly subnormal.

The tongue is coated and foul, the bowels constipated, and the discharge from the ear ceases or becomes much less in amount. To the above symptoms succeed in a few days those in which drowsiness and torpor, the result of increased intracranial pressure, are the most marked signs. All the senses seem dulled. The pain becomes much less severe, though frequently it is increased on percussion over the abscess. The patient is drowsy, cerebration is very slow, he answers correctly though after an abnormally long delay, and cannot sustain his attention for more than a few seconds, falling into a semi-doze during the time a question is being addressed to him. The pulse is markedly slow, and in one case it fell to 32 per minute. This is a most important point, for a slow full pulse of 44, together with agonising headache and the history of purulent otitis media, enabled Mr. E. H. Bonney to diagnose correctly a large temporo-sphenoidal abscess, upon which I operated successfully in December 1900. The temperature at this stage is commonly slightly subnormal or normal, in striking contrast to what is found in the other graver complications of purulent otitis media. The respirations also are slow, particularly in cerebellar abscess. Cheyne Stokes respiration is not infrequent in the last stages. I have recently reported a case in which I operated at Charing Cross Hospital in 1899 upon a dental surgeon, in whom a large cerebellar abscess caused coma with Cheyne Stokes respiration. Upon administering an anæsthetic, respiration ceased, and artificial respiration was maintained for forty minutes, when, the pressure being removed by the evacuation of the abscess, natural breathing recommenced. The patient quite recently presented himself in good health at the Medical Society of London.

Vomiting becomes now infrequent. Convulsions I have rarely met with. Paralysis is uncommon. I have, however, in two cases of abscess of the temporo-sphenoidal lobe noticed distinct hemiparesis of the opposite side of the body, and in two cases of cerebellar abscess marked weakness of the upper extremity of the same side of the body. Facial paralysis may be due to cerebral abscess, in which case the face is paralysed on the opposite side of the body to that in which the abscess is located. In such instances the paralysis is apt to be partial only. Far more frequently facial paralysis is due to involvement of the facial nerve in the aqueduct of Fallopius, in which case, of course, the face is paralysed on the same side as the diseased ear. In one instance I have seen bilateral facial paralysis. In this case there was a large abscess in the left temporo-sphenoidal lobe, which caused distinct weakness of the right side of the face, whilst the left side of the face was paralysed, owing to involvement of the nerve in the aqueduct of Fallopius. I regret to say that this fact was proved on post-mortem examination. The patient in whom this occurred had suffered from tertiary syphilis, and I have to share with a distinguished physician the blame of having deemed the bilateral facial palsy of syphilitic origin.

Paralysis of the oculo-motor nerve is frequent in temporo-sphenoidal lobe abscesses when of considerable dimensions. It is due, I think, almost always to pressure. When marked, it is most characteristic: the pupil is immobile and very dilated; there is external squint due to unopposed working of the sixth nerve, and also drooping of the upper lid. The third nerve on the same side as the abscess is, of course, the one involved. It will be seen that a large temporo-sphenoidal abscess may therefore, and frequently does, cause paralysis of the third nerve on the same side, and paralysis of face, and, to a less degree, of the arm on the opposite side of the body. It will be obvious that in such a case the paralysis of the facial muscles will be far more marked than that of the arm, owing to the fact that the centres for the arm lie higher than those for the facial muscles. The leg in such a case certainly escapes.

Contraction of the pupil is frequently seen in small abscess (due to irritation of the nerve; dilatation is due to pressure). Muscular twitchings I have often seen. Wasting is commonly observed after a cerebral abscess has lasted for some days or weeks. It is sometimes very marked. Aphasia I have only once noticed, and in this case there was word deafness. Aphasia it is always difficult, owing to the imperfect cerebration, to establish without doubt. Optic neuritis is generally met with, except in cases which develop with great rapidity before the optic neuritis has had time to manifest itself. I have commonly found it bilateral, but generally more severe on the side of the abscess. Whilst the presence of optic neuritis has a distinct value in the diagnosis of cerebral abscess, its absence must not be taken as proof of the absence of intracranial abscess, as it was absent in two successive cases of cerebral abscess examined by me. I have been struck by the fact that the most intense optic neuritis, in cases of cerebral abscess, has never, so far as I have observed, produced any really marked diminution of vision after recovery from the abscess.

I can make no definite statement regarding the reflexes, except to say that I have generally found ankle clonus present.

There is no doubt that cerebral abscess may become encapsulated. The first cerebral abscess I ever saw was one operated upon by Mr. C. W. Cathcart when I was house surgeon at the Edinburgh Royal Infirmary; in this case it was quite manifest that a second abscess had formed around a thick walled encapsulated abscess in the temporo-sphenoidal lobe.

Tenderness on percussion of the head over the site of the abscess has been asserted to be a valuable method of diagnosis. I confess I have only once found it at all helpful, and that was in the case of a small child seen in consultation with Dr. Howard Clarke. In general I have found that either the headache is too agonising to permit percussion, which intensely aggravates the patient's suffering, or the patient in the later stages too lethargic to mind much what was done to him.

Unless relieved by operation, the great majority of intracranial abscesses terminate in death, due either to coma from extreme pressure, or to the rupture of the abscess into the ventricle or on the surface of the brain—in which last case acute leptomeningitis with its train of symptoms develops. Rupture of the abscess into the lateral ventricles causes unmistakable symptoms; the temperature rises 6° to 8° in an hour; the pulse, previously slow, more than doubles, sometimes even trebles in rapidity; general muscular spasm or rigidity, and sometimes opisthotonus occur, with stertorous breathing, unconsciousness and coma rapidly terminating in death. I have thrice diagnosed rupture of a cerebral abscess into the lateral ventricle, and verified the diagnosis twice post-mortem. The third case I observed in 1899, when house surgeon to Professor Macewen of Glasgow; and though the patient was absolutely comatose, having gone through the stages enumerated above, complete recovery followed the evacuation of the pus, performed by Professor Macewen without anæsthesia.

The above remarks concern chiefly abscess of the temporo-sphenoidal lobe. Abscess of the cerebellum I have only seen four times, and of these three only were under my close observation, one under the care of Professor Macewen, and the remaining two in my own practice. Optic neuritis, vomiting, asthenia, wasting, marked yawning, were present in all three; weakness of the arm on the same side as the abscess, and difficulty in swallowing in two. All three cases were practically comatose when operated upon; in two no anæsthesia was employed, and two—one of Professor Macewen's and one of mine—recovered. It is frequently easy to diagnose an intracranial abscess, but impossible to locate it definitely. In June 1899 I operated upon W. H. G. B., a dental surgeon, at Charing Cross Hospital, for cerebellar abscess, and explored in the first instance the temporo-sphenoidal lobe. In December 1900, in the same institution, in the case of A. T., a female servant, I made the opposite mistake, and searched first the cerebellum in the case of a temporo-sphenoidal abscess. In both cases I rectified my error, and drained the abscess, and both patients, I am glad to say, recovered.

There is but one treatment for intracranial abscess, *i.e.* evacuate the pus and drain the abscess cavity. And no case must be considered hopeless. Well do I remember two apparently dying patients, one with an abscess of the frontal lobe which had ruptured into the lateral ventricle, and the other with a cerebellar abscess, operated upon by Professor Macewen within forty-eight hours of each other in May 1889, comatose and motionless even though operated upon without anæsthesia, and the lesson taught me when to my inquiry with reference to the first case, "Is it not quite hopeless, sir?" I was answered, "No one shall die under my care of intracranial abscess unrelieved if I can help it." Both these cases recovered, and, acting in accordance with the teaching of my master, it has been my good fortune to save three other cases so apparently hopeless that but for the encouragement given by Professor Macewen's results I might have allowed them to die unrelieved.

My experience leads me to state the opinion that the result of operative treatment in intracranial abscess uncomplicated by the coexistence of meningitis or lateral sinus pyæmia, is far more favourable than is generally believed. One observation before we leave the subject of intracranial abscess. Do not put off operation in the absence of localising signs. Twice in my practice I have had the misfortune to have patients die with unrelieved abscesses in temporo-sphenoidal lobe. Some months ago a patient was transferred to my care at Charing Cross Hospital by my senior colleague, Dr. Mitchell Bruce, suffering from great headache, vomiting, slow cerebration, blurring of the left optic disc, and a history of long-standing otorrhœa on the left side. I saw the man for the first time about 5 P.M. on a Saturday, and in full agreement with the opinion of two colleagues, who kindly saw the case with me in the absence of Dr. Bruce, decided to wait until the next day in order to see if any further symptoms should have appeared. I came to the hospital less than twenty-four hours afterwards, and told Mr. W. T. Mullings, M.B., the house surgeon, that I had come to explore the temporo-sphenoidal lobe. I was intensely disappointed to learn from Mr. Mullings that the patient had died suddenly ten minutes previously. Two months later, in a very similar case, I, rendered wiser by my former unfortunate experience, urged immediate operation. My opinion was, however, overborne by two physicians and the medical man in attendance, who were confident that there were no sufficient symptoms justifying exploration of the brain. In spite of very energetic protests on my part, operative interference was postponed, at any rate until the next day. The lady died in the night following the consultation. In both cases the pus was found on post-mortem examination, and two lives were sacrificed which should have been saved by timely operation.

And now to turn to the last complication to which I wish to refer, namely—

7. *Pyogenic lateral sinus thrombosis.*—This is a condition which is, I am convinced, far more common than is generally considered to be the case. It is one that I have many times seen in consultation, and I can only remember very few instances in which the condition had been correctly diagnosed by the medical attendant. You will therefore, I trust, pardon me if I refer somewhat at length to the symptoms of this condition, which, I am sure, we have all had under our care more often than we think. Purulent ear disease is by far the most frequent cause of septic thrombosis of the lateral sinus. The condition may arise from direct continuity of inflammation, as when the sinus becomes involved in disease of the inner wall of the mastoid process, or it may spread from a pyogenic thrombus in a minute vein entering the sinus. Hæmorrhage rarely occurs in pyogenic thrombosis, even when the sinus is eaten into by ulceration, as the blood in the sinus is almost always thrombosed prior to the actual perforation of the wall of the sinus. Soon the pyogenic clot begins to disintegrate, and portions are conveyed down the internal jugular into the right heart. The larger particles of germ-laden thrombus are conveyed into the lungs by the branches of the pulmonary artery, where they act to infective emboli. Other parts, especially the kidneys, joints, spleen, liver, and bones, may be similarly attacked by infarcts which cause secondary abscesses. Should the infection spread from the interior of the sinus, through its inner wall, leptomeningitis and cerebral or cerebellar abscess is prone

to occur, a complication frequently met with in pyogenic lateral sinus thrombosis. Pyogenic thrombosis of the lateral sinus gives rise to a train of symptoms, no one of which is diagnostic, but taken together they constitute a clinical picture which is fairly distinctive. Headache and vomiting are common, the latter chiefly in the earlier days of the malady, whilst the former is not so severe nor so persistent as in intracranial abscess or meningitis. Pain on tapping over the situation of the lateral sinus at the hinder part of the mastoid process, and pain on pressure over the upper two or three inches of the course of the internal jugular vein, can generally be elicited, and sometimes a hard swelling, the size of the little finger, can be felt at the upper part of the internal jugular vein. In certain cases the soft parts below the mastoid are much infiltrated. The temperature is very elevated, but exhibits great variations in the course of the day, being at one time 105° to 106°, and a few hours later falling to 100°. The pulse is very quick, 120 to 150, becoming more rapid and weak as the toxæmia deepens.

Rigors are certainly the most characteristic symptom. They are frequently almost the earliest symptom, as in the case of Mr. B., sent to me by Dr. V. Green of Wimbledon, who had a rigor whilst travelling in a train. At first, occurring every day, on alternate days, or even less often, they become more frequent as the condition develops. They are often of extreme violence, each lasting from ten to forty minutes, and at the termination of the rigor the patient is bathed in perspiration. It is remarkable how rapidly on the cessation of such a rigor the patient feels as well as he did before the rigor set in.

Œdema of the mastoid and occipital regions, caused by venous obstruction, is sometimes seen, but this is rarely a marked symptom.

The mental faculties in uncomplicated cases remain quite unimpaired. The skin is harsh and of a somewhat icteric hue. The tongue is dry and dirty, and the breath very foul. Diarrhœa is constant in the later stages. These symptoms, taken in conjunction with the general typhoid state of the patient, have, within my own experience, thrice led the medical attendant to diagnose the condition as typhoid fever.

The lungs, as would be anticipated, suffer in almost every case not relieved by timely operative treatment, owing to fragments of infective clot forming pulmonary emboli. The beginnings of the lung trouble are frequently masked. Cough is noticed for a day or so, then a sudden sharp pain in the chest, which lasts for half a day perhaps, and then subsides. This is repeated perhaps in two to six other parts of the lungs, and a few hours later the characteristic prune juice expectoration makes its appearance. This sputum becomes later mixed with muco-pus, and is horribly offensive. Even at the stage of prune juice expectoration prompt treatment is not entirely hopeless, but unless the supply of further infective material be cut off, infective pneumonia, leading it may be to gangrene of the lung, sets in, and death results from exhaustion and toxæmia combined.

It must always be borne in mind that meningitis and cerebral or cerebellar abscess may occur as complications of infective lateral sinus thrombosis, in which case the diagnosis may be rendered very difficult.

Endocarditis I have only met with once, in the case of W. H. G. B., admitted into Charing Cross Hospital, April 17, 1899. The heart was examined by several persons, and found to be normal. A week later endocarditis had developed, and shortly after this, Dr. Eyre, bacteriologist to Charing Cross Hospital, found streptococci in the blood. This remarkable case, in which the patient recovered, is fully reported in the *Transactions of the Medical Society of London* for the present year.

The invariable rule of practice in cases of pyogenic lateral sinus thrombosis must be incision of the sinus and clearing out the clot and puriform débris, with, in addition, division of the internal jugular vein between two ligatures. This operation in the five instances which I have operated, and in which the thrombosis was uncomplicated by meningitis or cerebral abscess, has been attended by the happiest results. In two instances in which leptomeningitis coexisted, and in one in which there was also a temporo-sphenoidal abscess, meningitis, and very fœtid purulent expectoration, the operation on the sinus was, of course, without avail. In uncomplicated cases there is no more beneficial or successful operation in the whole domain of surgery.

Time will only allow of the most brief remarks on the differential diagnosis of cerebral and cerebellar abscesses from—(1) Leptomeningitis, and (2) Infective lateral sinus thrombosis.

1. In meningitis the onset and course of the symptoms is much more rapid than in abscess, the temperature is high, the pulse rapid, there is general hyperæsthesia to light and sound. There are stiffness and rigidity, with sometimes pain in the neck. Involvement of the cranial nerves is common, and squint is frequently suddenly developed. These points stand out in such marked contrast to the symptoms of intracranial abscess, that in uncomplicated cases the diagnosis is generally clear.

2. Infective sinus thrombosis is also, as a rule, in uncomplicated cases readily differentiated from intracranial abscess, by the occurrence of violent recurring rigors, followed by profuse sweatings, the temperature very high at one time and falling several degrees in a few hours, the pulse very rapid and weak, the hard, cord-like swelling, and the pain on pressure over the upper part of the internal jugular vein, the œdema over the mastoid (if present), and the profuse diarrhœa.

May I once more be allowed to emphasise the point that all these dangerous conditions, most of which jeopardise life, result, in the large majority of cases, from neglect of treatment in what is sometimes called by the medical attendant, simple otorrhœa, and by the patient or patient's parent, a mere running from the ear. That they are therefore in large degree *preventible* maladies, and that, even when once started, many of them are by the performance of a timely and judicious operation amenable to treatment, and capable of giving some of the most brilliant success obtainable in the whole range of surgical practice. If success, however, is to be obtained in the operative treatment of these intracranial complications of purulent otitis media, it is incumbent upon the practitioner to have the courage to recommend it early in the course of the case, and not to let days, or even hours, that may make all the difference to the possibility of saving life, pass whilst he is waiting for further information, which he may find only when too late, at the post-mortem examination. I can safely say that I, as a surgeon, have never been consulted in such cases unnecessarily early, but more times than I care to think of, when it was too late.

If any here care to seek further information regarding the subject of my paper to-day, I would refer them to the wonderful and exhaustive work on "Pyogenic Diseases of the Brain and Spinal Cord," by the creator of cerebral surgery, Professor Macewen, F.R.S., to whose teaching and brilliant successes, when I had the privilege of serving as his house surgeon, I owe all the interest I have ever since taken in these conditions.

A NOTE ON THE TREATMENT OF THE ATAXIA OF TABES BY MEANS OF CO-ORDINATED EXERCISES.

By Edwin Bramwell, M.B., M.R.C.P. (Edin. and Lond.), *late House Physician National Hospital for Paralysis and Epilepsy, London.*

The writer being personally convinced of the value of co-ordinated exercises in the treatment of many cases of tabetic ataxy, proposes, in a short paper, to consider the method and its rationale, together with certain principles, a correct appreciation of which is essential for its successful application. Since there is little to be found upon the subject in English literature, it is hoped that the following remarks may prove of interest, and help to bring this method of treatment into the prominent place which it deserves to occupy as a therapeutic agent in the treatment of tabes.

Of all the symptoms from which the tabetic is liable to suffer, inco-ordination or ataxia is one of the most serious, for the patient is often handicapped at his work, and not infrequently totally disabled by the difficulty in walking which it produces. The importance of an effectual line of treatment directed against this symptom is self-evident.

Von Leyden,[1] so long ago as 1876, was of opinion that tabetics should be encouraged to walk, and that confinement to bed tended to increase the ataxia. It is unfortunate that this teaching is not more generally recognised and practised at the present time, for of its truth there can be little doubt. The writer can himself instance several cases where inability to walk, or a great increase in the ataxia, has followed apparently as a direct consequence upon unnecessary confinement to bed.

Von Leyden advanced the view that muscular effort is able, to some extent, to compensate ataxia, and that exercise is beneficial for the reason that it strengthens the muscles and maintains their nutrition. In 1889, it was pointed out by Frenkel of Heiden[2] that, in cases of tabes, by the accurate repetition of a movement a notable diminution of the ataxia in association with that movement is produced. This observation forms the fundamental principle upon which the method of treatment by co-ordinated exercises, the method of Frenkel, as it is sometimes called, is based. The results obtained by Frenkel were afterwards corroborated by Hirschberg,[3] von Bechterew,[4] Raymond,[5] and others, but it was not until the Moscow Congress of 1897[6] that the treatment attracted general attention. The continental literature upon the subject is now considerable, and the importance of the treatment as a valuable therapeutic measure is widely recognised.

Although a critical discussion of the physiology and pathology of co-ordination is quite beyond the scope of this paper, a few general remarks are necessary.

Muscular co-ordination is largely an acquired faculty. The young child is at first inco-ordinate, and learns by practice to bring under control the movements of its limbs, by associating and interpreting the various impressions which it receives during the performance of a motor act. The child learns to relate certain afferent impressions with certain movements. Many voluntary co-ordinate movements, which at first require considerable mental concentration for their correct performance, become, through practice, subconscious; such, indeed, is the case with most of the movements which we are constantly called upon to make.

Of the various views advanced to account for the ataxia of tabes, the so-called "sensory theory," which associates the ataxia with the degeneration in the posterior columns, has met with much acceptance. According to this theory, the ataxia of tabes results from a deficiency of afferent impressions, consequent upon the degeneration of certain afferent neurons. Owing to the destruction of these neurons, the information which the tabetic obtains is defective and erroneous, and gives an incorrect idea of the movement he is performing, with the result that the movement is consequently at fault. The tabetic must learn to forget the "movement memories" which served his purpose while in health, and proceed to acquire a new series of "movement memories," representing the impressions which he *now* receives in his diseased state through the neurons which remain intact. That this is possible is shown by Frenkel's observation that frequent and accurate repetition of a movement results in a diminution of the ataxia in association with that movement, until finally the movement can be made correctly and without the concentration of attention upon it which was previously necessary. The method is indeed, as Raymond aptly terms it, a "méthode de rééducation," and the exercises are to be regarded as "cerebral gymnastics,"[1] which do good primarily by diminishing the abnormal muscular work which is an essential concomitant of ataxia.

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[1] "Klin. der Rückenmarks-krankheiten," Berlin, 1874, Bd. i. S. 179.

[2] *München. med. Wchnschr.*, 1890, S. 917.

[3] *Bull. gén. de. thérap., etc.*, Paris, 1893, tome cxxiv. p. 66.

[4] *Neurol. Centralbl.*, Leipzig, 1894, S. 643.

[5] *Rev. internat. de thérap. et pharmacod.*, Paris, 1896, Nos. 4 and 5.

[6] *Compt. rend. du 12 cong. internat. de Méd.*, tome iv. part 1, p. 457.

Before entering upon a more detailed description of the manner in which the treatment is to be carried out, it will be convenient to refer, first, to certain factors which influence the prognosis of the ataxia; and, secondly, to consider the actual results which may be, or are in some cases, obtained by the treatment.

The statement has been made that many cases of tabetic ataxia are greatly benefited by this treatment. That all do not improve is equally true. Thus, in the existence of such complications as grave cardiac disease, serious bladder trouble, a disorganised joint, a perforating ulcer of the sole of the foot, etc., the treatment may be contra-indicated. In the case of an acutely developed ataxia, it is probably also inadvisable. Frequently recurring attacks of severe lightning pains or gastric crises, by the physical prostration which they produce and the confinement to bed which they necessitate, may counteract any improvement which is derived from the treatment.

The amount and rapidity of the improvement is largely influenced by the personal equation of the patient. Without doubt, the best results are obtained in persons who take an intelligent interest in the exercises, and who are at the same time gifted with mental concentration and perseverance. In the presence of a mental defect or disorder, where the foregoing qualities are deficient, little benefit is to be expected.

It is said that improvement occurs more rapidly in individuals who have previously been adepts in such exercises as skating, bicycling, etc., and this is just what one would expect. The prognosis as regards improvement is for the same reason probably more favourable in those persons who have the faculty of rapidly attaining proficiency in such co-ordinate exercises as those mentioned.

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[1] "Die Behandlung der tabischen Ataxie mit Hilfe der Uebung," Leipzig, 1900, S. 5.

In the case of "nervous" individuals, the difficulty in walking may appear to be quite out of proportion to the ataxia which is present. The unsteadiness may be due largely to lack of confidence; in such cases, the personal influence of the physician plays a most important part in the treatment.

Where there are no contra-indications and no grave complications, such as those mentioned, to interfere with the treatment, there is reason to believe that some improvement always occurs, provided the treatment is properly carried out. Even when the ataxia is so great that the patient is quite unable to stand, provided that this inability is due to the ataxia alone, the outlook is favourable.

The writer had recently the opportunity of treating a patient who had been unable to walk or stand for three years, and who, after ten weeks' treatment, was able to walk alone with the aid of a stick. Frenkel[1] has recorded the case of a man who had been confined to bed for seven years, and was quite unable to stand. After treatment, he walked without a stick so well that it was impossible to detect that he was ataxic; he could go downstairs, could walk in the street and travel in an omnibus like a perfectly healthy person. As showing the rapidity with which improvement may take place, the case of a woman who had been ataxic for two years forms a good illustration. At the commencement of the treatment she was markedly ataxic, and could walk only with support. After five weeks' treatment she could walk and turn without a stick almost as well as a healthy person. These three examples will serve to show the results which may be anticipated in suitable cases.

If the treatment is properly carried out, and the disease is not progressing rapidly, the amount of improvement which occurs in any given case depends largely upon the length of time the treatment is conducted. As Frenkel[2] points out, an individual is able to play the piano or to ride better after two months' instruction than after one. Frenkel[3] states that the duration of the improvement in the ataxia varies according to the course of the disease, *i.e.* whether it remains stationary or progresses. This is what one would be led to expect from the preceding theoretical considerations.

But, in the opinion of the writer, the beneficial effects of the treatment are not limited to a diminution of the ataxia. The change in the patient's mental disposition which occurs during the course of the treatment is often remarkable. That many tabetics should suffer from mental depression is only natural. To know that one is afflicted with a disease for which, as the patient has probably been repeatedly told, there is no cure, is naturally depressing. "So long as he is able to get about unaided he may live not only a useful but comparatively an enjoyable life; but when he has to rely upon the arm of an attendant, a pair of crutches, or a wheel-chair, fortitude deserts him, and with it hope and usefulness."[1] When he sees improvement taking place in his walking in consequence of this new treatment, he receives a great mental fillip; he again becomes hopeful and cheerful, his mental disposition often undergoing a complete change. The writer wishes to emphasise this result—the improved mental outlook—of the treatment; he has repeatedly observed it, and is of opinion that it has not hitherto been sufficiently insisted upon. Although most authorities state that the treatment is only effective in so far as it influences the ataxia, without affecting the course of the disease, the writer is inclined to doubt this, since he has seen diminution in the pains, improvement in the bladder trouble, and, in one case, return of sexual desire occurring during the course of the treatment. It seems reasonable, on theoretical grounds, to suppose that the improved nutrition of the muscles and the altered mental state may exert a favourable effect upon the disease generally.

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[1] Quoted by Ranzier, Robin, "Traité de thérap. appliquée," fasc. xiv. p. 432.

[2] *Op. cit.*, S. 280.

[3] *Deutsche med. Wchnschr.*, Leipzig, 1896, S. 820.

Before commencing the actual treatment of a case, it is, in the opinion of the writer, advisable to explain to the patient the way in which the exercises are supposed to act. He should be made to understand that his inability to walk is not due to muscular weakness, but to an inability to associate movements correctly; that the method of treatment is really a process of re-education, and that it is not the muscular force which he uses in performing the exercises which is of importance, *but the care and precision with which he makes the individual movements.* As in the case, for instance, of a child who is learning to write, a short period during which his mind is concentrated upon the correct performance of a movement is of much greater value than a longer period during which his attention is allowed to wander, and the exercises are, in consequence, gone through in a careless and slipshod manner. In other words, the patient must realise that the rapidity and amount of improvement will depend largely upon the care and precision with which he carries out the exercises.

It will be quite impossible in this paper to describe the numerous exercises which have been recommended by Frenkel,[2] Hirschberg,[3] Goldscheider,[4] Dana,[5] and others for the treatment of the ataxia. For the re-establishment of perfect co-ordination of *all* the movements of the limbs, an elaborate series may be necessary. Provided, however, that the physician appreciates and carries out the principles of the treatment, most satisfactory results may be obtained by the use of simple exercises such as those about to be described, for which little in the way of apparatus is required.

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[1] Collins, "Treatment of Nervous Diseases," New York, 1900, p. 242.

[2] *Op. cit.*, S. 149.

[3] *Bull. gén. de thérap.*, etc., Paris, 1893, tome cxxiv.

[4] "Anleitung zur Uebungsbehandlung der Ataxie," Leipzig, 1899.

[5] *Post-Graduate*, New York, July 1896.

Tabetic ataxia, as is well known, is very much more common in the lower than in the upper extremities.[1] The writer's experience has been almost entirely confined to the treatment of ataxia of the lower limbs, and the following description will be found to deal chiefly with exercises directed against the difficulty in walking which is thereby produced. The selection of exercises suitable to each individual case is left to the discretion of the physician; suffice it to say that even in those cases where the ataxia is slight, the value of the simpler exercises is considerable.

EXERCISES FOR THE LOWER LIMBS.—*Exercises while in bed.*—The patient lies on his back in bed and slowly raises his extended leg until he touches with his great toe the finger of the attendant held immediately above his foot, at a distance of 18 in. to 2 ft. from the bed. This exercise should be repeated several times with either leg.

Still lying on his back, he flexes the leg on the thigh to its full extent, and then slowly flexes the thigh on the abdomen; the whole limb is then gradually extended until he touches with his great toe the finger of the attendant, which is held in the same position as in the previous exercise. The limb is then slowly lowered to the bed.

For the next exercise a simple piece of apparatus is necessary, namely, two boards 3½ ft. long and 9 in. in breadth. One long edge of board A is attached along the middle of B, so that, looked at from the end, the extremities of the board form the letter T, the limbs of the T corresponding to the breadth of the boards, namely, 9 in. The apparatus is placed across the foot of the bed, resting on board B. Along the unattached edge of board A are six grooves 1½ in. deep, 3 in. in width, and at a distance of 3 in. from each other.

The patient lies on his back with his heels resting in two of these grooves; at the word of command, he lifts one heel from the groove in which it lies, and places it accurately in the groove named by the attendant. For this purpose it is convenient to have the grooves numbered; they should, too, be well padded.

Standing exercises.—A very ataxic patient who has been long confined to bed has forgotten how to stand, and when helped out of bed his legs slide away from under him. His feet are to be placed in position, and, with some one supporting him on either side, he is to be encouraged to practise his balancing power, gradually putting more and more weight upon his legs. He is to practise standing with his feet close together, lifting one foot off the ground and placing it down again accurately.

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[1] A. B. Bonar has recently analysed 286 cases of tabes from Allen Starr's Clinic, at the Columbia University. Of these, "ataxia was present in the legs in 202 cases, or 70·62 per cent. Ataxia was also present in the arms in twenty-two of our cases" (7·69 per cent.).—*Journ. Nerv. and Ment. Dis.*, N.Y., May 1901, p. 268.

Other and more difficult exercises are the following:—Standing with eyes closed and feet close together, standing on tip-toe, standing on one foot with closed eyes, etc. Sudden giving way of the legs is a symptom which may prove troublesome when an ataxic patient first begins to stand and walk. Even where there is not a high degree of ataxia, this symptom is sometimes present. The writer has found that the support which may be obtained by bandaging the knees firmly is of value in such cases.

Walking exercises.—A black stripe 12 in. broad is painted across the floor of a room or on a piece of waxcloth. The patient walks along this stripe, either with support or in the go-cart, taking care to keep his feet within its margins. He may walk with bare feet or with his boots on,[1] the former he will probably find the more difficult. Having mastered this exercise, he practises walking along a similar stripe, on which at distances of 1 ft. cross lines are painted. This is more difficult than the last exercises, for here he has not only to keep his feet within the limits of the black stripe, but whenever he takes a step the toe must be placed down exactly at the cross line. This exercise is very important, since, by teaching the patient to take steps of regular length, it necessarily greatly simplifies the co-ordination *required* in the act of walking.

There are two features of the tabetic gait which are often noticeable even when the ataxy is slight. First, a tendency to bring the heel to the ground before the toe—in other words, to walk upon the heels; and, secondly, a tendency for the patient to turn his toes outwards when he walks. Special attention is to be directed to the correction of these points.

When the patient has acquired skill in the exercises already described, he proceeds with similar exercises upon a narrower stripe (6 in. in breadth); as he is now obliged to walk upon a "narrower base," this exercise is more difficult than that last mentioned.

The patient is to practise walking sideways along these stripes, and turning round within a circle of small radius. Having attained proficiency in the above, he may attempt the same exercises on tip-toe or with bent knees.

According to the degree of the ataxy, support may or may not be necessary in carrying out all these exercises. Thus at first the patient may require some one on either side to prevent him falling, or he may be able to walk the lines with the go-cart. As he improves he is able to walk with sticks, and, finally, unaided. The "step" from walking in the go-cart to walking with sticks is a difficult one, and improvement is often delayed at this point; more especially is this the case with patients who have little confidence in their own capabilities, and will risk nothing. The writer has found a pair of low parallel bars of great service at this stage. The patient walks between the bars and in this way learns to do with less and less support, gaining the confidence in his own powers which is necessary when he first begins to walk with sticks.

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[1] More than one ataxic patient has mentioned to the writer the benefit he has derived when walking, from an indiarubber heel attached to his boot.

As soon as the patient has learned to walk on level ground fairly steadily and confidently, he may be taught to walk up and down stairs. In a hospital, where cases of tabes are constantly being treated, a specially constructed staircase of several steps, 3 or 4 ft. in breadth, will be found of value. With a rail in each hand the patient sooner acquires confidence, and makes more rapid improvement than on an ordinary staircase. In a private house, where such a staircase is not available, he will probably at first require the support of an arm while he holds the banister in his other hand. Each step has to be taken just as carefully as when he walks on level ground. A tabetic is not uncommonly to be seen going upstairs in the following fashion: he raises the foot and puts it down on the next step correctly, then, instead of taking the step by contracting his quadriceps, he straightens the leg, and, using it as a lever, pulls himself up by the aid of his hands. He has forgotten how to use the legs when going upstairs, and until his error is pointed out, he will make no progress.

Again, the patient must practise sitting down and getting up from a chair. A chair with arms will be found useful for this purpose, or, better still, a seat placed between parallel bars. He is to persevere with this exercise until he can sit down perfectly naturally.

A great number of exercises have been recommended for the upper limbs. The physician may devise exercises suitable to the peculiarities of any case he meets with, and provided that he adheres to the principles of the treatment, he will obtain good results. Such exercises as piling draughts one upon the top of another; placing marbles of different size into the numbered cups of a solitaire board; drawing patterns and figures; connecting with a pencil points marked out on a large sheet of paper, etc., will be found to be of use.

The length of time daily which should be given to the exercises must depend on the individual case. A quarter of an hour, two or three times a day, will probably be sufficient at first. In less severe cases more time may be given to practice. After each exercise the patient should take a short rest. An exercise must be stopped on the earliest appearance of fatigue, or if there are any signs of the patient's attention beginning to wander. Clinical and experimental[1] evidence are in accord as to the harmful effects of muscular over-exertion upon the degenerative process in the posterior columns. In this relation it is well to remember that tabetics have not unfrequently lost, to some extent, the sense of fatigue.

Frenkel attaches great importance to the alacrity with which a movement is performed upon the word of command.

He insists that if good results are to be obtained, the physician must personally superintend the treatment, to keep up the interest of the patient, to encourage him, and to point out his difficulties.

From these remarks it will be seen that patience and perseverance on the part both of the patient and the physician are required if full benefit is to be derived from the treatment.

N.B.—The explanation of the ataxia of tabes is without doubt more complicated than it would appear to be from the foregoing remarks. No attempt has been made here to discuss the subject, further than to suggest what appears to be the most reasonable view of the rationale of the method of treatment under consideration.

TUBERCULOSIS OF THE HEART MUSCLE.

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Having recently had occasion to collect the literature of this subject by reason of a case that came under my own notice, I may perhaps, with advantage, record the results of my investigation —the more so as no synopsis of recorded cases appears to have been made in this country. Apparently, until 1826, it was generally held that the heart muscle was exempt from tuberculosis; this was ascribed to its unceasing contractions and the copious blood supply afforded to an organ of the highest functional activity. In that year Laennec, in his famous "Treatise on Auscultation," stated that the heart muscle was susceptible to tuberculosis, but left it to Townsend of Dublin in 1832 to record a case of his own observation. Succeeding years have contributed reports of fifty-seven cases, but inasmuch as no less than twenty-five of these belong to the last decade, it is not unreasonable to suppose that the lesion would have been found more often had it been more often looked for. On the other hand, it must be admitted that in the absence of a bacterial examination, some cases may well have been written down tuberculous that should have been set to the account of syphilis. Virchow considered that gummata were sufficiently distinguished by their fibrous envelope from tuberculous nodules, but Fuchs has recently shown that a similar capsule may surround a nodule, the nature of which has been proved to demonstration by the presence of Koch's bacilli. It is more than doubtful if the affection of the heart muscle is ever primary; in only two cases has such a suggestion been put forward, and in one of these general tuberculosis was present, while in the other the nature of the heart lesion was not confirmed by a bacterial examination. Beyond question nearly all the cases are secondary to tuberculosis of the thoracic organs; the associated lesions may, however, be widespread and various. Adherent pericardium is almost constant, but tuberculosis of the myocardium may exist without any affection of either pericardium or endocardium. In a very large proportion of cases the mediastinal and tracheo-bronchial glands and the lungs have been extensively and obviously tuberculous. The frequency of adherent pericardium would suggest that the usual mode of propagation to the heart muscle is by direct extension. In some instances this is clearly the case, but in others perfectly healthy heart muscle intervenes between the adherent pericardium and the tuberculous deposit. A second mode of access is almost certainly through carriage by the blood; this would best explain the generalised distribution of the lesions in some cases, while the frequency of this generalised form in the wall of the left ventricle throws suspicion on the blood of the pulmonary veins. Cabannes and others have brought forward strong evidence of still a third mode of propagation, by the lymph stream. As already mentioned, the mediastinal lymph glands are usually found to be tuberculous. The liability of children to tuberculosis of these glands would serve to explain the marked incidence of the affection on children. Valentin gives the following summary of forty-one cases:—

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[1] *Neurol. Centralbl.*, Leipzig, 1898, S. 429.

Up to 15 years	18 cases
From 15 to 45 years . . .	16 „
„ 45 to 60 „	3 „
„ 60 to 65 „	2 „
At 71 „	1 „
At 72 „	1 „
	41

Again, if infection were propagated from these glands to the heart muscle, it would be reasonable to expect that the nearest portion of the heart would be most vulnerable. This is actually the case, for there is a marked predilection for the right auricle, and in particular for its anterior and upper aspect. It may be objected that such propagation is in the reverse direction to the lymph stream, but probably tubercle, like cancer, may find its way readily against the stream.

Tuberculosis of the heart muscle occurs in one of three typical forms. The first and most common form is the *large tubercle.* Commonly the size of a lentil, it is at times much larger, even as big as a hen's egg; its outer part is firm and whitish, but the centre may be soft and yellow from caseation. It is usually multiple, sometimes single. It may be buried in the heart muscle, or project immediately beneath the endocardium or pericardium. Thus it closely resembles a gumma, but, lying as it does in immediate contact with the muscle fibres, it may generally be distinguished by the absence of a connective tissue capsule.

A second and later form is the *miliary tubercle,* in which the heart muscle is besprinkled with more or less numerous grey granulations, which may be visible beneath the serous coats; they are small transparent bodies about the size of a pin-head.

The third form is a true *tuberculous myocarditis,* that is to say, the heart muscle is invaded by areas of fibrous tissue in which are found collections of young cells and giant cells, with Koch's bacilli. It is a widespread process, affecting a large extent of heart muscle, and distinct from the small scattered areas of sclerosis that may be found around the large tuberculous masses. It is characterised by induration, with thinning and greyish discoloration of the tissue, while the healthy residue of muscle has undergone hypertrophy. Some doubt has been thrown on the existence of this form, inasmuch as it depends on the record of a single case, in which the diagnosis was founded on the presence of giant cells, which are known to occur in other conditions, and not on the presence of Koch's bacilli. *A priori* there is no unlikelihood of the occurrence of a sclerosis in the heart muscle, under the influence of the toxines of tuberculosis, of the same nature as occasionally is seen in the liver, kidneys, and lungs. If the tuberculosis were superadded to an already existing myocarditis, we should expect to find a history of some traumatic influence such as rheumatic fever, as is often forthcoming in tuberculous pericarditis.

Thus tuberculosis takes the same form of growth in the heart muscle as it does in the lungs, but it is questionable whether the process in the heart muscle ever advances to the stage of ulceration, so familiar in the lung. Murchison recorded its occurrence, and Lancereaux accepts his opinion. Given the same liability to sepsis as prevails in a tuberculous lung, there is clearly no reason why tuberculosis should not pass on to ulceration in the heart muscle, but the absence of such conditions should certainly make ulceration at this site a matter of extreme rarity. Corresponding to these three naked-eye types, there will be seen under the microscope either groups of young cells or typical tubercles with giant cells surrounded by epithelial and round cells, or old nodules with a caseous centre, or tubercles that have undergone fibroid transformation. Koch's bacilli may usually be found, and in considerable numbers, though Valentin maintains that they are few and far between. They stain well by a method given by Mallory and Wright. Stain lightly in hæmatoxylin alum, then for two or three minutes in steaming carbol-fuchsin; decolorise in 1 per cent. alcohol for half a minute; wash thoroughly in water; dehydrate in alcohol; clear in xylol, and mount.

Once the bacilli have penetrated the heart muscle, the lesions tend to group themselves around the vessels, in the spaces of Henle, in the connective tissue spaces, and between the muscle fibres. The main changes in the adjacent heart muscle are of degenerative type, tending more or less to atrophy from pressure; sometimes, however, a localised fibrosis is seen, while the more distant muscle undergoes variously hypertrophy or dilatation.

While generalised tuberculosis, by reason of its carriage in the blood, seems to disseminate itself chiefly over the left ventricle, the more common and larger nodules are usually located in the right auricle. Thus in Cloessen's and in Pollak's cases, the growth in the wall of the right auricle is described as of the size of a hen's egg, while Semprun found several ovoid tumours each as large as a pigeon's egg. Cabannes has drawn attention in a short brochure to this peculiarity. These large nodules develop between the muscle fibres, which are either pushed aside or destroyed; a layer of muscle fibres, thinned out and stretched over them, may separate them from the endocardium or pericardium. The auricle in such cases may assume enormous dimensions. In Semprun's case it was as large as a pear; in Fontoynont's it was like a second heart superimposed on a first; in Rochet's and Cloessen's cases the tumour partly compressed the mouth of the superior vena cava; while in Kaufmann's case the tumour actually bulged into its orifice.

The study of the clinical aspect of myocardial tuberculosis is most unprofitable. Diagnosis is forbidden—even to the youngest of us—and death alone unveils the secret of these hearts. For the most part the condition is masked by the manifest evidence of tuberculosis in other organs, and if perchance the symptoms call attention to the heart, there is nothing but what is seen daily in gradual heart failure. Arrhythmia, tachycardia, embryocardia, asystole, dyspnœa, hide under their foreign garb no peculiar significance. In Townsend's case, above cited, paroxysms of cyanosis and dyspnœa gave birth to a posthumous knowledge of their cause.

ON THE STERNO-COSTAL VENOUS FESTOON.

By GEORGE THIN, M.D., *London.*

PHYSICIANS who have had occasion to look at the thorax of young and adult men must have frequently observed a remarkable development of the veins over the lower part of both sides. The appearance may be described with fair accuracy as that of a venous sterno-costal festoon, a band of small veins passing downwards and outwards from the lower end of the sternum towards the sides below the nipple line. Frequently this venous festoon stands out boldly on a pale skin on which no other veins are visible, and at once arrests the attention, but there may be sometimes observed on other parts of the chest a few scattered enlarged veins of various sizes. When closely examined, the small veins of which the festoon is formed are seen to have an average diameter of about a millimetre. The festoon itself is usually about $\frac{3}{4}$ in. broad.

Although I do not think much has been written about this condition, its existence is of course well known, but I believe that the cause of the abnormality is not thoroughly understood. It is usually attributed to some form of difficult or laboured breathing, and is thought to be associated with emphysema.

I have had frequent opportunities, for many years, of examining the thorax of young and adult men, and of seeing, in a certain proportion of cases, well-marked examples of this sterno-costal festoon. I have not made notes of many of these cases, but in nearly every instance in which I have observed the condition I have endeavoured to ascertain whether its presence could be accounted for. The proportion of cases in which it is found is not large, and although I have not collected data on which I could base a statement of the proportion of cases in which it exists, I believe I am correct in stating that it is found in a very small minority.

From the position of the festoon, it appears that it is composed of venules which unite to form the veins that correspond to the two terminal branches of the internal mammary artery, especially the musculo-phrenic, which corresponds roughly to the attachment of the diaphragm, and it is owing to its anatomical position and relation to the diaphragm that it is generally believed to be connected with some abnormality of the pulmonary system. My experience leads me, however, to believe that it is not associated with emphysema or any other morbid affection of the lungs. My reason for this belief is that, in the very great majority of cases in which I have observed it, I have carefully examined the lungs and found them to be healthy. It occurs, in my experience, as frequently in healthy young men between the ages of 20 and 30, as in the middle-aged and elderly men who suffer from emphysema, or from difficulty in breathing from other causes. As the condition, once established, becomes permanent, I believe that in the very great majority of cases in which it is found, if not in all of them, in persons with habitual laboured breathing, the festoon had been formed in youth, when they were quite well, and before there was any question of pulmonary disturbance.

An analysis of the habits of young men in whom it is found has shown me that in most of them a history can be found of violent exercise having been taken at irregular intervals. It is not common, I believe, in the ordinary artisan whose muscular exercise is regular. It is equally rare amongst a class of Scotch clerks—I may instance more particularly bank clerks—who, I find, as a rule, do not take part in games attended with much exertion, their exercise during their apprenticeship often being limited to a short daily walk. As a class, these young men measure from 1 to 2 in. less round the chest than the young Englishman who has been trained to such sports as running and football. But the condition is by no means uncommon in young men in England who are addicted to the more severe games and sports, but whose avocations allow them to indulge in them only intermittently. I have observed it in young University men, who are in the habit of taking violent exercise at irregular times; in young engineers whose work was comparatively easy, but who, in cases of emergency, require to work extremely hard for two or three days at a time; and in men who, after spending five or six days in an office during the week, on the sixth or seventh day occasionally practise running or rowing to the full extent of their powers.

To generalise: my experience teaches me that the sterno-costal festoon occurs in men who take occasionally long-sustained and violent exercise when their ordinary mode of life prevents their being in "hard" condition; and if my suggestion is correct, it would indicate that, in young men in a "soft" condition, the walls of the small veins are less resistant and more dilatable than in those whose condition is described as "hard."

If, as the anatomical position of the festoon would seem to suggest, we are to associate its occurrence with the attachment of the diaphragm, it is to be inferred that during violent and repeated strain on the diaphragmatic muscle the venules of that part of the skin are distended with blood for a sufficiently long time, and to such an extent, as to put great pressure on the walls,—a pressure which, in the "soft" condition of the person, they are unable to bear without yielding. If this hypothesis is correct, it shows that the strength of the elements of the venous walls, and their power of resistance, are very closely associated with the "hard" and "soft" condition of the individual.

My explanation of the cause of the festoon is supported by what I have observed in men who have spent some time in the tropics, amongst whom I believe it is found with relative frequency. The tendency to relaxed condition of the system is considerably greater in tropical than in temperate climates, but young men in the tropics and subtropical countries are much devoted to all the forms of games and exercise which are practised in England, and the circumstances in which most of them are placed in these countries leads to the same kind of spasmodic exercise which is in many cases inevitable at home. Rowing, paper-chasing, running, and football are quite common amongst these young men, whose habits of life are the antithesis of what is supposed to be favourable to the production of the "hard" condition.

Although the festoon is often observed in persons who show no other venous abnormalities in their skin, there is to be observed in a certain number of these cases other signs of a tendency to dilated cutaneous veins, showing that, although the operative cause is most pronounced in the diaphragmatic region, weakness of the veins is also present in other parts of the body. It is not uncommon to find in these cases well-marked, scattered, ramifying enlarged veins running over the surface of the thorax and even on other parts. In one of the most marked cases of sterno-costal festoon which I have seen, the subject of it presented such a cluster of large veins on the backs of his hands as to produce actual deformity.

I do not know whether this condition is found in females, as I have not had the same opportunities of observing its presence or absence in their case, but that a similar condition may occur in women who take violent exercise without sufficient training is very probable. Indeed, it was after I had been consulted by a lady who had enlarged cutaneous veins above the shoulder, that I conceived the idea of inviting attention to this local affection of the skin.

The number of women who cycle has placed many of them under the conditions in which this local venous dilatation might develop, and it would be interesting to know whether the sterno-costal festoon has occurred to any extent amongst female cyclists.

The lady to whom I have referred consulted me on account of a condition of the cutaneous veins which seemed to me analogous, both in nature and cause, to the sterno-costal festoon in men. She was aged about 40, healthy, strong, and active, and had taken enthusiastically to cycling, riding occasionally for considerable distances. After cycling for some time, there developed on the upper part of the back some enlarged, tortuous veins, in the region traversed by a line drawn from the upper and inner angle of the scapula, extending upwards over three of the vertebræ. This cluster of veins was entirely exposed when the lady wore evening dress. Not being the cause of any discomfort, I was consulted simply on account of the deformity. She had never previously observed anything similar on her skin, and it was only after she had cycled for some time that the enlargement of the veins appeared.

I have never attempted to treat any of these cases. The lady who had enlarged veins from cycling was unable, on account of distance, to undergo consecutive treatment, but were it desired to treat the condition on exposed parts of the chest or shoulders, it would not be difficult, with a little patience, to remove or very much mitigate the appearance. Treatment by scarification and electrolysis, which is so efficient in cases of small veins showing on the nose, would be equally effectual on other parts of the skin.

THE RELATION OF ALCOHOLISM TO TUBERCULOSIS.[1]

By T. N. KELYNACK, M.D., M.R.C.P., *Medical Registrar, Royal Infirmary, Manchester.*

ALCOHOLISM and tuberculosis stand foremost amongst the conditions hampering human progress and limiting man's happiness. Through them the evolution of the race has long been impeded, and, unfortunately, in spite of numerous restraining and restricting efforts, their baneful influence is still accountable for a high degree of mortality, and an immense amount of sickness and suffering.

The stay of such calamitous states has long afforded problems which have appealed to all sorts and conditions of men, and their solution is yet to a great extent unaccomplished, and surrounded by difficulties.

With two such morbid influences barring human advance, it was but natural that eager minds studying the one should have been compelled to recognise the presence and action of the other. Hence questions as to the association and true relationship of alcoholism to tuberculosis are of old standing. But since the answers have lacked in uniformity, it is particularly desirable that at least some approximation to the truth should be arrived at.

The position has been well expressed by Payne,[2] who says: "With regard to the influence of alcohol on the production of tubercle, the utmost divergence and indeed contradictory opposition of opinion prevails. Huss found tuberculous phthisis to be rare in drunkards; and that has been the general conclusion drawn from post-mortem observations. It has even been thought that drinking freely checks the progress of phthisis, but of this I can find little evidence. On the other hand, the more general impression is that alcoholism is a frequent cause of consumption."

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[1] Substance of a paper presented to the British Congress on Tuberculosis, London, 1901.

[2] *Trans. Path. Soc. London*, 1889, vol. xl. p. 332.

And Dr. Payne goes on to say, "On this disputed point we must appeal to the methodised experience of those who have special opportunities of observation."

This subject, however, is one full of peculiar and unavoidable difficulties. And not the least arises from the prejudices which, however repugnant to scientific research, have only too frequently warped the minds of those who attempted an investigation of the matter. Efforts to elucidate the question by an appeal to what has been termed clinical statistics is necessarily permeated with fallacy.

Purely experimental research, although in many ways valuable and suggestive, nevertheless, in the presence of modifying influences, concerning which we have but little knowledge and but limited control, is apt to lead to unreliable conclusions. Mortality returns, although rendering material for interesting and it may be useful analysis, afford data too gross for anything but rough generalisations. A study by the pathological examination of a large number of cases would seem to afford the most hopeful method of investigation, and when combined with discriminating clinical observations is likely to accomplish as near an approach to the truth as we are able to obtain under present circumstances. But before indicating the manner and results of such a method of inquiry, it will be well to refer briefly to the opinions which various authorities, based on exceptional experience or special inquiry, have formed on the relationship of alcoholism to tuberculosis, particularly in this country. Three views are possible, and each has had its advocates—(1) That alcoholism is antagonistic to tuberculosis; (2) that alcoholism bears no special relationship to tuberculosis; (3) that alcoholism definitely predisposes to tuberculosis.

1. ALCOHOLISM ANTAGONISTIC TO TUBERCULOSIS.—Before the true nature of tuberculosis became apparent, the opinion was somewhat widely held that the subjects of alcoholic excess seldom suffered from consumption or other forms of tuberculosis, and some went so far as to claim that the alcoholic state was antagonistic to tuberculosis. This impression still exists amongst a large section of the public, and probably in some measure is a survival of the opinion expressed by many of the earlier writers on pulmonary tuberculosis. Indeed, in some medical quarters such a view is still not altogether discarded.

The idea that alcoholism was in some cases a preventive of tuberculosis, may perhaps in part account for the advocacy of its persistent and even excessive use in phthisis. Certainly the use of alcohol in cases of pulmonary tuberculosis has long been a vexed question, and even yet there is much confusion as to purpose and great variation in practice.

Walshe apparently favoured the moderate use of alcohol in phthisis.[1] Bennet[2] also, writing some thirty years since, said: "Of late years, in America, alcohol, especially whisky, has been much lauded as a remedy in consumption"; but added, "I have seen a certain number of cases in which it had been long taken, but I cannot say with benefit. The daily ingestion of large quantities of nerve-stimulating, carbon-producing spirit certainly does not come under my ideas of hygienic treatment." Flint[3] used alcohol freely, that is from 6 oz. to a pint of spirit daily, and appears to have considered it beneficial, "but not in the sense of exerting a special influence upon the disease." Charteris, writing in 1877 concerning the administration of whisky to phthisical patients, says, "In private practice I order it to be taken *ad libitum*." Hermann Weber[4] in 1885 was convinced of the great usefulness of alcohol in the treatment of phthisis. Thomas Harris[5] some few years since tried the effects of whisky containing 53 per cent. of alcohol, during a period of nine months. Twenty-six cases were so treated, the doses commencing with 2 drms. of pure whisky gradually increased up to 1½ oz. of whisky every four hours day and night. Dr. Ransome, who saw many of the cases, expresses the opinion that "at certain times of the day the dose of alcohol was unnecessarily large . . . for some of the patients at times were distinctly flushed, and slept heavily even in the daytime." Dr. Harris states: "No case left the hospital in a worse state than that in which he entered it. As regards the physical signs, very little difference could be detected between those at the date of admission and the date of the discharge of the individual." Manifestly in no instance did "cure" occur.

Reference has frequently been made to Stokes' account of a gentleman who recovered from pulmonary tuberculosis after regularly drinking "seven tumblers of punch every night"; but it is sometimes forgotten that at the same time he was to a great extent living an outdoor life, duck-shooting every day that he could go out, and, according to his own account, "had to stand up to my hips in the Shannon for four and five hours of a winter's day, following the birds."[6]

It is interesting to note that Bell[7] of New York, as far back as 1859, opposed the view generally current, for he then stated: "The opinion so largely prevailing as to the effects of the use of alcoholic liquors, namely, that they have a marked influence in preventing the deposition of tubercle, is destitute of any solid foundation. On the contrary, their use appears rather to predispose to tuberculous deposition. When tubercle already exists, alcohol has no obvious effect in modifying the usual course it takes. Neither does it mitigate, in any considerable degree, the morbid effects of tubercle upon the system in any stage of the disease."

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[1] "Diseases of the Lungs," 4th edition, London, 1871, p. 496.

[2] "On the Treatment of Pulmonary Consumption," London, 2nd edition, 1871.

[3] "Phthisis," London, 1875.

[4] *Lancet*, London, 1885, vol. i. p. 606.

[5] Ransome, "The Treatment of Phthisis," London, 1896, p. 95.

[6] "Clinical Lectures on Fever," *Med. Times and Gaz.*, London, 1854, vol. xxx. p. 487.

[7] *Med. Times and Gaz.*, London, 1859, vol. i. p. 587.

The abolition of alcohol from many modern sanatoria seems to indicate that, as Dr. Ransome[1] well expresses it, "owing to the terrible consequences of excess, and to the proclivity of mankind to its excessive employment, it (alcohol) can only be recommended in selected cases with many cautions."

2. ALCOHOLISM UNRELATED TO TUBERCULOSIS. — Many hold that alcoholism bears no special relationship to tuberculosis: that it neither prevents nor predisposes to infection. This view seems to have been generally held by the older writers on tuberculosis.

In going over the literature of phthisis published prior to the discovery of the tubercle bacillus, one cannot but be surprised at the very few references to alcoholism as a factor of etiological importance. Even when mentioned, it is generally in such terms as indicates that it is not considered as particularly influential.

Ancell,[2] writing in 1852, expressed his opinion that "a careful consideration of all the facts brought forward by the best informed pathologists . . . leads to the conclusion that tuberculosis and the formation of tubercle is not one of the effects of alcohol, either in the human frame or in the lower animals." A similar opinion was expressed by Cotton[3] in 1858 in his Fothergillian Essay, where he says, "It is worthy of remark that the habitual drunkard—he who is always in his cups—is not very often the subject of phthisis: such at least is the result of my own observations." Many still contend that alcoholism can only be considered as related to tuberculosis in so far as it leads to a lowering of general vitality, and places the individual under conditions particularly favourable to infection.

3. ALCOHOLISM AS A PREDISPOSER TO TUBERCULOSIS. — The view that alcoholism definitely predisposes to tuberculosis has of recent years received much support. The tendency of modern opinion is to recognise in alcohol an agent which renders the tissue specially prone to tuberculous infection. This is well exemplified by several recent expressions.

Hector Mackenzie[4] believes that "alcoholism must be regarded as a powerful predisposing cause of tuberculosis. It is almost invariable to find tubercle present in the lungs in patients dying in the course of alcoholic paralysis. Tubercle of the peritoneum or pleura frequently complicates cirrhosis of the liver. Alcohol in excess undermines the strongest constitution, and renders the body less resistant to disease of all kinds. This is especially true when the individual leads a sedentary town life. Considerable amounts of alcohol may be taken without obvious deterioration of health by persons who lead an out-of-door life and eat heartily." "Alcoholic subjects appear to be specially liable to acute miliary tuberculosis." One of the most recent and definite pronouncements is that of Professor Thomas Oliver,[1] who says: "Nor is there any truth in the opinion held by the laity, that the use of alcohol protects the individual against tuberculous disease. I do not refer to such a restrictive employment of alcohol as a glass of beer or stout, or a little wine at dinner-time. That may be helpful to the individual. It is to the mistaken opinion that where there is a family predisposition to the disease, it is necessary to be somewhat more indulgent. In my experience of young men with a hereditary tendency to phthisis, alcohol has, by the late hours which it encourages, and the careless and irregular habits that it fosters, frequently precipitated the individual into active tuberculous disease, which abstinence and more careful living would have assuredly prevented. It indirectly favours the development of tuberculous disease. Pulmonary tuberculosis was found by Dickinson to be more frequent in drinkers than in ordinary people in the proportion of three to one. Rolleston, quoting H. Mackenzie, states that in sixty-seven cases of pulmonary tuberculosis occurring in drinkers, a family history of tubercle was only found in ten, whereas it is found in about 30 per cent. of the ordinary cases. The frequent association of pulmonary tuberculosis with alcoholic peripheral neuritis, and its presence, too, in nearly one-third of the cases of cirrhosis of the liver, are circumstances which show that under the debilitating influence of alcohol resistance is reduced, ordinary pulmonary catarrhs are not so quickly thrown off, and thus the bacillus of tubercle gains an easier entrance."

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[1] "The Treatment of Phthisis," London, 1896, p. 94. See also "Sanatoria for Consumption," by F. R. Walters, London, 1899.

[2] "Treatise on Tuberculosis," London, 1852, p. 456.

[3] "Consumption: its Nature, Symptoms, and Treatment," London, 1858.

[4] "Text-Book of Medicine," edited by G. A. Gibson, Edinburgh and London, 1901, vol. i. pp. 352, 371.

Some have held that there is a tendency to phthisis in alcoholics to assume the fibroid form, but this is not in accordance with the best modern experience.

Poore and Allchin,[2] in a recent article, speak of "the association of tuberculous phthisis with alcoholic cirrhosis of the liver as well established, the course of the disease being usually one of rapid caseation and excavation with broncho-pneumonia, and rarely towards fibrosis."

It is of interest to note that many years since the late Sir Benjamin W. Richardson[3] recognised the special proclivity of alcoholics to phthisis, and even went so far as to describe a special form of alcoholic phthisis.

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[1] "Text-Book of Medicine," edited by G. A. Gibson, 1901, vol. i. p. 603.

[2] "Manual of Medicine," edited by W. H. Allchin, London, 1900, vol. iii. p. 52.

[3] *Med. Press and Circ.*, London, 1875, vol. i. pp. 224, 265; also "Diseases of Modern Life," 4th edition, London, 1877.

The close association of tuberculosis and alcoholism has now been widely recognised, not only by British physicians, but also particularly by American and French observers, who appear to recognise more fully than has hitherto been the case in this country, that there are very important sociological and economical as well as medical aspects of the question. Osler,[1] voicing American experience, is very definite: "It was formerly thought that alcohol was in some way antagonistic to tuberculous disease, but the observations of late years indicate clearly that the reverse is the case, and that chronic drinkers are much more liable to both acute and pulmonary tuberculosis. It is probably altogether a question of altered tissue-soil, the alcohol lowering the vitality and enabling the bacilli more readily to develop and grow." Maurice Letulle[2] has recently drawn attention to the frequent occurrence of pulmonary tuberculosis in the alcoholic workmen of Paris. He believes that chronic alcoholism prepares the way for the development of phthisis, that it aggravates the tuberculous condition when established, increases the gravity of the prognosis, and enfeebles the therapeutic action of hygienic and dietetic measures. These considerations he would have brought before the notice of the public. A campaign against tuberculosis he holds should be associated with anti-alcoholic efforts; and to this end the establishment of popular "anti-alcoholic restaurants" is advocated.

Thorain[3] also insists on the importance of adopting measures for repressing the progress of alcoholism as among the important prophylactic procedures for the stay of tuberculosis. Robin also shows that alcoholism is capable of creating a soil for tuberculosis. De Lavarenne[4] has recently discussed the association of alcoholism and tuberculosis; and now we have Professor Brouardel's testimony that alcoholism is a potent factor in propagating tuberculosis.

The evidence of Ruata[5] respecting Italy is interesting: "Alcoholism in central and lower Italy is almost unknown, while it is tolerably widely spread in Piedmont, Lombardy, and Venice. In Milan, the most industrial town in Italy, possessing a large number of manufactories, alcoholism is widely spread, and the mortality from tuberculosis resembles that of England."

Various suggestions have been made to explain the special liability of alcoholics to tuberculosis. There can be no doubt but that the non-hygienic surroundings of many chronic alcoholics afford very important conditions to tuberculous invasion. The vitiated atmosphere of the public-house, the uncleanly habits of many of the frequenters, the overcrowding and promiscuous congregation of individuals in varying states of health and disease, furnish circumstances peculiarly suited to the spread of tuberculosis. But most important of all, the filthy and dangerous condition of many bars and beer-houses, from the reckless deposit of sputum on the floors, where, quickly becoming dry, it mixes with the dust which is continually being raised by the moving crowd, furnishes a fruitful source of infection. Moreover, it must be remembered that many of the habitual frequenters of these places are often in an advanced stage of phthisis.

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[1] "Principles and Practice of Medicine," Edinburgh and London, 1898, p. 382.

[2] "l'Alcoholisme dans ses rapports avec la tuberculose pulmonaire," *Lutte Antituberculeuse*, May 31, 1901, p. 25.

[3] "Thèse de Paris," 1894; see *Rev. d. sc. méd.*, Paris, 1894, tome xliv. p. 262.

[4] *Ann. d'hyg.*, Paris, 1901, No. 3.

[5] *Med. Ann.*, Bristol, 1901, p. 537.

Having had exceptional opportunities of studying large numbers of cases amongst workhouse and hospital patients, I am convinced that the public-house must be considered as one of the most serious obstacles to the speedy stamping out of tuberculosis in this country. It is very necessary that sanitary authorities should recognise this most important aspect of the tuberculosis question. It should also be remembered that statistics have clearly demonstrated the liability of brewers and publicans to phthisis.[1] Dr. John Tatham's valuable returns on the mortality from tuberculous phthisis in England and Wales during the last forty years strikingly illustrate the heavy death-rate in inn and hotel servants.[2] But in addition to the danger of sinking into habits of excessive alcoholic indulgence, workers in public-houses are also subjected to the prejudicial influence of long hours in ill-ventilated apartments, necessary association with uncleanly and it may be tuberculous individuals, noise, excitement, anxiety, and the depressing influences of an environment where evidences of human misery and degradation are only too apparent.

The sluggish, loafing, or sedentary habits of the chronic alcoholic, and the unfortunate circumstance that practically all drinking in this country is carried on in-doors, must not be lost sight of. The movement to establish outdoor cafés may well be supported on hygienic grounds.

But the chronic alcoholic is probably always the subject of more or less nutritional impairment. Frequently there is a very conspicuous lowering of vitality, and in not a few instances states of pulmonary congestion and even hæmorrhage exist which undoubtedly furnish a suitable soil for the development of the tubercle bacillus.[3] Perhaps sufficient attention has not been given to the occurrence of states of auto-intoxication which undoubtedly prevail in many alcoholics.

It is also well to remember that the chronic alcoholic, as the result of his habits, is frequently driven to engage in particularly unhealthy occupations, and his reckless indulgence commonly leads him to rest content with an overcrowded, dirty, dark, and ill-ventilated dwelling; induces him to grow accustomed to an insufficiency of suitable food, and subjects him to the devitalising influence of depressing emotions.

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[1] "Hygiene, Diseases and Mortality of Occupations," by J. T. Arlidge, London, 1892.

[2] See paper presented to State Section of British Congress on Tuberculosis, 1901.

[3] See Communication by Delépine, *Trans. Sixth Internat. Cong. Hyg. and Demog.*, vol. ii. p. 226.

It is of interest in this connection to note that, as regards the association of tuberculosis and malignant disease, an analysis of Manchester cases[1] indicates that the subjects of cancer do not show any special tendency to contract tuberculosis, and that malignant disease has little or no influence in reviving latent tuberculous processes. But it is contended by some that besides a general impairment of vitality and pernicious environment, there is a special prejudicial influence arising from the action of the alcohol and its associates.

This is a contention peculiarly difficult of proof. The evidence at present available is perhaps inconclusive. There are, however, certain experimental facts which go to show that alcohol has a marked influence in altering or determining an alteration of the cells of animals subjected to the action of certain pathogenic organisms. Professor Sims Woodhead[2] has shown from observations on animals that alcohol predisposes them to specific infectious disease. Professor Abbott of Pennsylvania, and also Dr. Delearde working in the Institut Pasteur at Lille, have recently shown that alcoholised animals are more readily infected by many organisms than non-alcoholised animals; and other investigators have also shown that alcohol produces a marked negative chemiotaxis. It has also been shown by Laiteneu that animals brought into a state of chronic alcoholism are much less readily rendered experimentally immune to microbial infection. Attempts have also been made to show that alcohol, through its influence on nervous structures, renders the tissue, and especially the lungs, prone to invasion by tubercle.[3]

In order to compare the views and opinions above indicated with our Manchester experience, I have analysed the results of pathological observation of a large number of hospital cases. A reference to pathological data probably affords the most reliable basis for the formation of sound views as to the relationship of alcoholism and tuberculosis.

Alcoholic neuritis and phthisis.—Some time since I collected a number of fatal cases of peripheral neuritis occurring in chronic alcoholics.[4] Eight cases were subjected to pathological examination during a period of three years. They formed 1·6 per cent. of all the medical cases examined during that period. Pulmonary tuberculosis was met with in seven. This gives a percentage of over 87. All the cases were females. In only one subject were there distinct tuberculous lesions elsewhere than in the lungs, and there the intestines were also affected. In one subject there was an old tuberculous focus at the apex of the lung, but it seemed probable that the active phthisis arose from a fresh infection rather than from this latent patch. In five cases both lungs were more or less involved. In two the left was the only one showing any distinct tuberculous lesion. In three of the cases the course had been rapid. In four it seems to have lasted for several months. One subject, it was stated, had "spat blood" six months before her death. In one case one lung only was studded with small tubercles, the injection evidently having been recent. In two there was more or less extensive caseation. Four presented evidences of softening and cavitation, and in two of these there was some fibrosis.

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[1] Kelynack, *Med. Chron.*, Manchester, 1897, vol. vii. p. 717.

[2] *Brit. Med. Journ.*, London, July 13, 1901; and *Edin. Med. Journ.*, August 1901.

[3] Mays, "Pulmonary Consumption, Pneumonia, and allied Diseases of the Lungs," New York, 1901, p. 61.

[4] Kelynack, *Med. Chron.*, Manchester, 1895-96, vol. iv. p. 180; *Med. Mag.*, London, July 1901, p. 396.

Since analysing the above, I have gone over my more recent pathological notes. Two further cases of alcoholic multiple neuritis have come to autopsy. In one, a male, æt. 35, the subject also of hepatic cirrhosis, both lungs were studded with recent tubercles. There was no softening, but caseous foci at the apices were apparently of older formation than the tubercles elsewhere. In the other case, a female, æt. 32, in whom there was also a fatty and cirrhotic liver, the lungs, although congested, œdematous, and presenting patches of broncho-pneumonia, showed no distinct evidences of tubercle. Thus out of ten fatal cases of alcoholic neuritis, nine females and one male, eight, or 80 per cent., were the subjects of pulmonary tuberculosis.

In 1895 I expressed the belief that "it is desirable to treat cases of alcoholic paralysis in special hospitals, in country houses, or in healthy private houses, rather than in the almost unavoidably tubercle-contaminated wards of a general hospital"; and further experience has but strengthened this opinion.[1] As far as it is possible, outdoor treatment should be provided for all alcoholics, and it is most desirable that retreats for inebriates should in many respects, and particularly as regards opportunities for outdoor life, closely resemble the sanatoria for tuberculous cases.

In connection with the recent remarkable outbreak of arsenical neuritis in Manchester and district,[2] and occurring in the most serious forms in alcoholics among the poorer classes, it is interesting to note that in a considerable number of the fatal cases active pulmonary tuberculosis was present, and in some undoubtedly much hastened the end.

Tuberculosis is also of frequent occurrence in the subjects of alcoholic cirrhosis of the liver. In order to throw light on this matter, the records of 3053 medical cases examined in the Pathological Department of the Manchester Royal Infirmary have been analysed.[1] One hundred and twenty-one examples of common cirrhosis of the liver were collected, and all doubtful and complicated cases omitted. Cases associated with cardiac or such chronic affections as seemed to have led to secondary changes in the liver were also excluded. All examples of "biliary" cirrhosis, and those in any way connected with syphilis, were passed over. After omitting several doubtful cases, in twenty-eight tuberculosis, either active, latent, or obsolete, was present. Thus over 23 per cent. presented evidences of tuberculosis. Active phthisis was present in fourteen, twelve males and two females; and active peritoneal tuberculosis in twelve, nine males and three females. Of these, six males and one female had involvement of both lungs and peritoneum. In five males and one female the lungs were affected, and in two males and two females the peritoneum alone. No less than twelve, or nearly 10 per cent., of the 121 cases appeared to die directly from tuberculosis. The average age of those in which active tuberculosis was limited to the peritoneum was nearly 47 years. The average age of those in which active tuberculosis was limited to the lungs was just over 44 years.[2] I have also been much struck with the frequency with which so-called tuberculous peritonitis is met with clinically in the subjects of hepatic cirrhosis. In many cases it is manifestly of the nature of a terminal infection, and the post-mortem characters of many of our cases have shown such to be the case.

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[1] *Med. Chron.*, Manchester, December 1895.

[2] "Arsenical Poisoning in Beer Drinkers," by T. N. Kelynack and W. Kirkby, London, 1901.

I have recently communicated with all the retreats and reformatories for inebriates mentioned in the Report of the Government Inspector, with a view of obtaining data as to the frequency of pulmonary tuberculosis in such class of alcoholics. Unfortunately, however, scientific records are apparently not generally available in such institutions. Of course the persons admitted are, as a rule, carefully selected, and presumably submitted to medical examination, and it may doubtless be taken that those presenting evidences of tuberculosis would be excluded. It is therefore particularly desirable that all such institutions should make returns as to the number of cases developing phthisis during their retention.

It is also to be hoped that those life assurance societies who have so-called temperance sections will in future afford data respecting the prevalence of phthisis amongst the non-abstainers as compared with the abstainers, as such is likely to be of much interest and undoubted value in indicating the relative liability to tuberculous infection of the two classes.

Without going into a consideration of points connected with the morbid anatomy of the question, it may be admitted that tuberculous processes as met with in alcoholics do not present any special or exceptional features. As in other states, there is very considerable variety in the exact character of the lesions. In many cases there is a rapid extension of tubercles, and the destructive process in the lungs often runs a rapid course. The pathological characters of the lungs in many of the cases I have examined have much resembled those met with in cases of diabetics dying with phthisis.[1]

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[1] Kelynack, *Birmingham Med. Rev.*, 1897.

[2] Kelynack, *Med. Chron.*, Manchester, 1896-97, vol. vi. p. 262.

In many cases, however, the onset is insidious and the progress accompanied by comparatively insignificant clinical manifestations; and hence the importance of very carefully examining all alcoholics suspected of being tuberculous. At present the material for a statistical expression of the frequency of the association of tuberculosis and alcoholism is lamentably meagre; but such evidence as is forthcoming appears to furnish strong ground for the belief that measures aiming at the extermination of tuberculosis should also include means for the suppression of alcoholism.

TYPHOID BACILLURIA.[2]

By C. J. Lewis, M.D., D.Sc. (Pub. Health), F.R.C.P.Ed., *Edinburgh.*

Typhoid bacilluria is one of the complications of enteric fever, the importance of which has only recently been accorded its full significance. Its essential feature is the presence of the *Bacillus typhosus* in the urine, either alone or, it may be, associated with other organisms.

For a long time it has been recognised that the fæces of enteric fever patients contained the means of spreading the disease, and it has been the routine practice for these to be disinfected in all cases, but it has not been the custom to disinfect the urine passed independently of the fæces. The recent acquisition of knowledge concerning typhoid bacilluria suggests that the consideration of the propriety of similarly disinfecting the urine is a question for every practical physician, and more especially for those engaged in the preservation of the health of the public. As a contribution to the study of this question, I shall briefly describe the symptoms, onset and duration, the infectivity, diagnosis, frequency, and treatment, both personal, and for the prevention of the spread of enteric fever.

The Symptoms.—First and foremost, it is necessary to emphasise the fact that there may be no symptoms to call attention to the condition, and unless the physician is aware of this, and on the look-out for the condition, it may be present without recognition. This is specially true during convalescence, when all is going well, and nothing occurs to excite suspicion. On the other hand, there may be symptoms which should at once direct attention to the urine; in a considerable proportion of cases pyuria is present; the pus is not necessarily present in large quantities, but if the urine be examined microscopically, pus cells as well as bacilli are present. In these cases the urine is faintly acid, certainly not alkaline, and contains no sediment and no albumin, or such a small quantity as to render its recognition a matter of delicate testing.

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[1] During the nine years, 1891-1899, I acted as pathologist to the Manchester Royal Infirmary, of nineteen diabetic cases examined, 57·89 per cent. presented evidences of pulmonary tuberculosis. See *Med. Press and Circ.*, London, June 26, 1901.

[2] Read at a Meeting of the Stirling, Kinross, and Clackmannan Branch of the British Medical Association, June 20, 1901.

This is the condition which may be regarded as typical typhoid bacilluria; there is little or no frequency of micturition, no discomfort in the region of the bladder; the urine is acid when freshly passed, and contains large numbers of typhoid bacilli in pure culture, along with some pus cells and no albumin.

If the fresh urine be transferred to a test tube, and held up to the light, it is seen to be very slightly turbid throughout, and if the tube be shaken a peculiar "shimmer" is seen, such as may be seen sometimes in a broth culture of certain organisms after a few hours' growth. A different type of the disease is occasionally met with, in which the urine is very cloudy, thick with urates and pus, but seldom alkaline in reaction; the typhoid bacillus may be present in pure culture, but usually there are other organisms also present, notably the *B. coli communis.* This form is accompanied by pain and discomfort in the bladder, frequency of micturition, and is a cystitis with its usual phenomena. There is often albuminuria, and the shimmer is absent.

ONSET AND DURATION.—Typhoid bacilluria is rarely present in the early stages of the fever; it may come on in the second or third week, not usually before the third week, and may then continue for a varying length of time. Sometimes it only lasts until a few days after the temperature has become normal, or it may persist for several weeks during convalescence, or even months after the illness commenced.

If its duration does not long exceed the period of fever, the organisms disappear from the urine very rapidly, being present in large numbers one day and entirely absent a few days later. On the other hand, the bacilluria may not begin until convalescence is progressing, and may then last a long time.

The urine in typhoid bacilluria is in fact a culture, more or less pure, of the *B. typhosus,* which is present in enormous numbers. From 5 to 170 millions are reported as present per c.c., and the c.c. being little more than a quarter of a teaspoonful, the number passed per diem is prodigious.

The condition is believed to arise in the escape of a few organisms through the kidney, and their multiplication in the bladder. They have been found in the glomeruli of the kidney, but the balance of experimental evidence is in favour of the view that some breach of excretory membrane is necessary for their escape, and that there is no true elimination by the kidney.

INFECTIVITY.—Proof that the typhoid bacillus is excreted in the urine, in a condition capable of infecting other persons, has been very definitely forthcoming. Picture to yourselves a khaki-clad warrior returned from South Africa to his village home, after a severe attack of fever, micturating in the privacy of his own garden, the drainage from which was thoughtfully directed into a well water supply. An epidemic breaks out in the houses supplied by this well, and an alien and virulent *B. typhosus* finds a suitable environment for its ravages.

The evidence directly connecting the outbreak with the soldier's return is circumstantial and probable, if not actually proved, but actual proof of the infectivity of typhoid bacilluria is, like the toys, "made in Germany." Petruschky relates the case of a nurse who contracted the disease by drinking out of a drinking-glass which a patient, then suffering from bacilluria, had in an urgent moment used as a urinal!

FREQUENCY.—Concerning the prevalence of the bacilluria, there is much difference of opinion, some observers finding the bacillus present in all the enteric urines examined, and others in very large percentages; other observers have failed to find them in any case examined, and the truth is hard to find. The dubiety is due to the similarity which the typhoid bacillus bears to certain other organisms, especially that very ubiquitous organism, the *B. coli communis*.

All the early observations are ruled out by the fact that the distinguishing tests between these organisms have only been recently perfected. Horton Smith in London, and Richardson in America, whose observations are worthy of credence, on account of their careful bacteriological execution, agree in stating that 25 per cent. of cases of enteric fever show typhoid bacilluria: I have no doubt that they are correct as to their cases, but I think that even a smaller percentage may be found correct in other cases.

Petruschky's results give a percentage of 6; he found it three times in fifty cases, and his work also is bacteriologically indisputable. Carver met with no instance of it in sixteen cases, and others report varying percentages.

I have recently examined forty-five cases occurring in the Edinburgh City Hospital, involving a large number of specimens, and found the condition present in only one of the forty-five. The explanation appears to me to lie in the gravity of the cases investigated. Enteric fever in London has a higher mortality than in Edinburgh, and typhoid bacilluria is certainly more often associated with grave attacks, even though non-fatal, than with mild ones. If all the mild cases were examined, as well as the severe ones, I think the percentage would not exceed 10 per cent.

As a confirmation of this view, Kuhnau's researches on the presence of the typhoid bacillus in the blood appear to support this view; he states that the blood in enteric fever only contains the bacillus in 25 per cent. of cases; now, in order to reach the urine, it must be present in the blood; and it is hardly likely to reach the urine in every case in which it is in the blood, since the kidney does not eliminate it. I set aside the suggestion that the bacillus may reach the bladder direct from the bowels, as the evidence of organisms doing so, during life, is inconclusive.

DIAGNOSIS.—The main element in diagnosis is, that the practitioner shall be aware of the condition, and on the look-out for it. The urine should be watched, and any cloudiness in an acid urine, especially if it appear suddenly some day, should insure further investigation. Look out for this, and for the "shimmer," and examine the urine microscopically The drop of urine examined with a high power will show large numbers of small, very actively motile, organisms, and possibly some pus cells. It is no use to examine in this way urine which has been passed for some time, it is always swarming with cocci; but if a fresh acid urine, examined directly it is passed, reveal organisms, the practitioner may be fairly certain that he has to deal with a bacilluria. Unless he is able himself to cultivate the organism and decide its nature, it is then advisable for him to obtain a specimen of the urine, passed into a sterile flask, either direct or per catheter, and send it to a laboratory for report.

An ordinary specimen is not satisfactory unless some such precaution is taken; the typhoid bacillus,owing to its cultural and other characteristics, being very difficult to obtain from an impure culture.

TREATMENT AND PROPHYLAXIS.—*Personal.*—To cure a case of typhoid bacilluria, there are available two methods—internal treatment and injections into the bladder.

Drugs.—The best internal remedy is *urotropin;* it should be given in doses of 10 grs., thrice daily, and continued for a few days; its effects require watching, as it may not agree with the digestion, or may even cause hæmaturia, and the dose may require modification; usually, however, it is readily retained and assimilated. The urine should be watched during its administration, and it is likely that in a few days the organisms will have entirely disappeared; but it is not well to trust to their having done so finally, as they may recur again, so the urine must still be watched, and perhaps smaller doses continued for a few days. On any recurrence the full dose must be resumed.

Formalin is a powerful germicide, and urotropin is believed to be eliminated by the kidney in that form.

Injections.—As bacilluria is a bladder condition, the injection of antiseptics may be useful, though usually the internal treatment is effectual, and more acceptable to the patient.

A weak solution of corrosive sublimate is much superior to any other injection; though boracic acid is very commonly used, and is good, it is not so effectual; so that, if there is no contra-indication to the use of mercury, weak corrosive is best, as fewer injections are needed, and there is less chance of recurrence.

Prophylaxis.—The prevention of the spread of enteric fever by means of the urine, is to be accomplished by efficient disinfection—inefficient disinfection is worse than useless, since it engenders a false feeling of security. The best disinfectant in typhoid bacilluria is *heat*. The urine should be boiled to insure destruction of the bacillus, though it is killed even at lower temperatures than boiling point. This method is impracticable in all cases, but in a fever hospital it would be possible to provide a cauldron in which urine could be boiled, allowed to cool, and then discharged into ordinary drains.

All vessels and urine receptacles should likewise be disinfected, and for these, as well as for the urine itself, where heat is not available, disinfectants must be used.

Admixture of the urine with the disinfectant must be thorough to be effectual; and, after mixing, it must be allowed to stand for half an hour before discharge into drains, to give the disinfectant time to act.

Equal quantities of 1–20 carbolic acid and urine should be mixed together, to obtain sterility in that time, or, if perchloride of mercury be used, a sufficient quantity must be added to give, with the urine, a solution of strength 1–1000. After this has been allowed to act, the mixture may be diluted before discharging it down ordinary drains. Izal is also useful, if used as directed for carbolic acid.

The quantities of disinfectant required, and the intelligent labour required in their use, contribute to render disinfection by heat preferable.

Finally, let us consider the question, Should disinfection of the urine be a routine practice in all cases of enteric fever? and answer it in the light of our present knowledge of the condition of typhoid bacilluria.

Looking to the fact that the majority of cases of enteric fever never have bacilluria, the routine disinfection of all enteric urines would entail a large amount of unproductive labour, and may be omitted; *but*, on the other hand, looking to the fact of its occurrence and infectivity, detection of all cases must be aimed at, and then the urine must be rendered innocuous. The detection of the condition lies, in the first instance, in the hands of the general practitioner and those in charge of fever hospitals. I recommend that, for one fortnight before the return of all enteric patients to communal life, the doctor should each day inspect the urine for cloudiness, and satisfy himself that there is no bacilluria, before allowing the patient to leave his supervision.

In this way the chances of the spread of enteric fever by this method may be greatly minimised. If, in any case, the medical attendant suspects bacilluria, it would be well to send a specimen for examination by a bacteriologist; it is not necessary here to go into the distinctions between the *B. typhosus* and the numerous organisms which closely resemble it, microscopically and culturally. It is sufficient to say that the organism must answer to a large number of tests, only possible in a laboratory, before it can be undeniably asserted to be the *B. typhosus*. *When in doubt*, the practitioner would be wise to disinfect the urine, while awaiting the bacteriologist's report.

CLINICAL RECORDS.

CASE OF CONGENITAL DEFORMITY OF THE HEAD.

By JOHN BENJAMIN HELLIER, M.D., *Hon. Obstetric Physician, Leeds General Infirmary; Lecturer on Diseases of Women and Children, Yorkshire College, Leeds.*

CONGENITAL deformity of the head is of two kinds—that which is produced from internal causes, such as developmental defect or hydrocephalus, and that which is due to the action of external forces during pregnancy or labour. Cases of deformity from injury or moulding during parturition are well understood, but the following case of marked deformity is apparently from extrinsic cause and of præ-partum occurrence. The writer has never seen or heard of a similar case, and hence feels that it is important to record it.

CASE.—The head presents a constricting groove which encircles the head at the level of the orbits anteriorly, and of the posterior fontanelle behind. The child was born August 5, 1900, and the appearance then presented was as now, except that the shape of the head has somewhat improved. If one could imagine a tourniquet to be applied around the head of a new-born child, and then screwed up till the skull was dented all round, the condition so produced would fairly resemble that now observed. The scalp is covered with scanty hair, but the whole of the groove is bare, so that a ring of baldness corresponds with the mark on the head. No gaping of sutures, no undue patency of fontanelles, no sign of hydrocephalus. The child has a rounded, prominent overhanging frontal region, and a prominent occipital position with a depression between. A good grip of the hand is present. The child has average intelligence, and there are no signs of spastic paraplegia.

I have obtained the following history through the kindness of the medical attendant:—

The mother was a primipara. She had a fairly comfortable pregnancy, except that she suffered much from neuralgia in the later months. The head presented in the first position. It was not impacted; on the contrary, it descended easily. As the mother was somewhat excited and bore her pain badly, chloroform was administered and forceps were applied. It was a very easy forceps case, and neither the head nor the face of the child were marked by the forceps blade. The child weighed 5 lb. only. The mother had post-partum hæmorrhage and phlegmasia in both legs. A few days after birth the child developed subacute ophthalmia with thick secretion.

On February 28, 1901, I saw the child again. It then weighed 9¼ lb. The head was a better shape, the forehead not so prominent.

Slight beading on ribs. The corneæ are almost opaque with chronic inflammation.

It is plain from the above history that the deformity was not produced at birth. The mark on the skull does not correspond with any line of fœtal cleavage, and one does not see how any arrest of development could give rise to it. It is plain that it has been caused by some constriction of the skull.

Only two theories occur to the writer. One is that constriction of the umbilical cord might have caused the condition observed. It seems very unlikely that this was the case. It is difficult to think that the cord could have been drawn tightly enough to cause such extreme consequences, and yet not have suffered strangulation in its own vessels; and it seems unlikely that the cord would become fixed in such a position. The other and more probable explanation is that the deformity is due to amniotic adhesion, and to an amniotic band around the head constricting it. It is not difficult to see how such an adhesion might seriously interfere with the development of the hair follicles.

The subject of the occurrence of amniotic bands and adhesions, and their association with oligo-hydramnios, is not a new one in the literature of obstetrics or of teratology. The following are the principal facts known about this condition:—

Adhesions between the skin and the amnion may form in early pregnancy, and are often associated with an abnormally small quantity of liquor amnii, which may be thick and viscid in consistence and grey in colour. When the liquor amnii accumulates and the amnion is pushed away from the skin, bands are formed where these adhesions occur (Simonart's bands).

These may be thin and threadlike, or thick, dense, and membranous. They occur most frequently between the extremities and the amnion. They are able to cause deformities, angularities, fractures, etc., and they may cause strangulation and amputation of limbs, the strangulated part remaining atrophied on the trunk. Moreover, the amniotic adhesions may take place at the lines of fœtal cleavage, and thus the proper closure of the parts may be hindered. Also, the bands may be connected with internal organs, such as the base of the brain, the liver, stomach, spleen, kidneys. In this way may be explained the occurrence of many cases of cleft and fissure in the fœtus, such as hare-lip and cleft palate, and defects in the abdominal walls. The bands may atrophy before birth, and so not be found at that period. Winckel, in his "Text-book of Obstetrics," Fig. lxxxv., shows a good example of such amniotic bands associated with double hare-lip. Another most interesting illustration will be found in Hirst and Piersol's work on "Human Monstrosities."

The adhesions may be of inflammatory origin. In the case in point the fact that the child's eyes showed ophthalmic neonatorum may suggest a possible cause of inflammatory intrauterine processes.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Reports for 1898–99 *and* 1899–1900. By the MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD. London: Printed by H.M. Stationery Office.

AMONG Annual Health Reports published in Great Britain, those by the medical officer of the Local Government Board are easily first. The medical officer's Report is but a "Supplement" to the Board's Report. The twenty-eighth and twenty-ninth "Supplements" are before us. A full set of those Reports, well studied, were enough to equip the most encyclopædic mind for the work of imperial and local health administration. There is not a problem, hardly a detail of daily practice, left unrepresented. The two Reports before us are not less crowded nor less valuable than any of the many others. To the administrative record is added a long record of researches—a leading feature of these Reports. All a reviewer can do is to isolate a few indications of the principal results recorded in the 1300 pages.

1. *Vaccination.*—For 1896 the "vaccinable" births were 914,205; for 1897—the latest period for statistical purposes—927,518. In 1896 the percentage "successfully vaccinated" was 66; in 1897 it was 62·4. For 1896 there were 209,007 (*i.e.* 22·9 per cent.) "unaccounted for"; for 1897 there were 22·7 unaccounted for. The percentage unaccounted for in the Metropolis was (1896) 26·4; (1897) 29·1: as against 22·3 and 21·6 for the rest of England. When one imagines what the "susceptibility" of 200,000 unvaccinated persons must be, these figures assume some significance. In 1897, some 3·4 per cent.—that is, a trifle of 31,687 infants—had "obtained for them under the Act of 1898" certificates of "conscientious objection." This is the first "flight of births" to "benefit" by the Act. A comparative figure is not yet possible. It is satisfactory to note that, if for the Metropolis the "unaccounted for" continue to go up proportionally, yet for the "rest of England" they are not so high in 1897 as in 1896. The Act of 1898, it is understood, has resulted in an increase of vaccination. Of "insusceptibility," this is important:—For 1896, some 2885 were "certified" as "vaccinated unsuccessfully at least three times." The medical officer hints some scepticism of the real insusceptibility after repeated trials. He says: "No such case was met with during 1898-99 amongst 3548 primary vaccinations performed by the Board's operators, and this number being added to the 107,180 similar cases referred to in my last Report, gives a total of 110,728 consecutive primary vaccinations performed under the Board's auspices without the occurrence of a single case of so-called insusceptibility." Obviously, there is something in "auspices." Where apparent "insusceptibility" does occur,

it is well first to infer that the lymph is inert or the method of inserting it bad; the last thing to infer is that the infant is insusceptible.

2. *Glycerinated calf lymph.*—The Report for 1898-99 contains full particulars of how the lymph is prepared for distribution. But even the extended premises for the preparation and provision of lymph have proved inadequate. "Glycerinated calf lymph was, in response to 47,097 applications from public vaccinators, issued in 1899 to the amount of 499,281 capillary tubes." During the year 1899-1900, lymph from 256 calves was issued. Each calf was killed (after yielding the lymph) and examined by a veterinary surgeon. In two cases tuberculous lesions were found, and the whole stock of lymph from these was destroyed, none being issued. The other calves were certified "healthy." There is a valuable report by Dr. Fremlin on the bacteria found in calf lymph during the process of glycerination. In 500 specimens of "lymph pulp" examined, *Staphylococcus pyogenes aureus* was found in all the 500; *Staphylococcus pyogenes albus*, in 484; a bacillus resembling, if not identical with, the *Bacillus variabilis lymphæ vaccinalis* of Dr. Nahanishi (a supposed variety of Klein's *B. xerosis variolæ* and of Klein's *B. albus variolæ*), in 370; *Staphylococcus cereus albus*, in 300; *Streptothrix alba*, in 50; hay bacilli, in 31; *Sarcina lutea*, in 22; *Staphylococcus pyogenes citreus*, in 7; *Staphylococcus cereus flavus*, in 6; *Penicillium glaucum*, in 4; *Proteus vulgaris*, in 2; and *B. fluorescens liquefaciens*, in 1. These are all "extraneous organisms." In "freshly made glycerin emulsion of lymph pulp" the average number of colonies is 120,000 per loopful. "A number of lymphs of indifferent quality averaged, at glycerination, 234,000 colonies per loopful on agar plates." One begins to wonder whether aseptic surgery, strictly applied to the calves from the start, and maintained right through, would not lessen these hordes of "extraneous" organisms. The primary effect of glycerin is to inhibit the growth of these micro-organisms. "Generally, plates seen at the second week of glycerination exhibit very tiny colonies. As a rule, a fresh glycerin emulsion, which on plate cultivation shows 120,000 colonies, will, one week after, show an average of 700 colonies per loopful. Two weeks after, an average of 50 colonies per loopful. Three weeks after, an average of 10 colonies per loopful. Four weeks after, there are usually no colonies noted in one loopful." The effect of glycerin, however, is not uniform; it varies with the species. Experiments are being "devised to ascertain if lymph pulp as such contains any anaërobic micro-organisms, and if so, what is their nature."

These are interesting facts. From the clinical side, the detailed record of the recent Glasgow epidemic may be expected to give us another variety of facts, namely, those bearing—(*a*) on the immediate protective potency of glycerinated calf lymph, (*b*) on the duration of the immunity due to such lymph. It is worth recalling that, as a result of his experience of the 1872 epidemic, Dr. J. B. Russell advised revaccination of all over five years of age. In the recent Glasgow epidemic, the same rule was followed—presumably, also, as the result of experience. Further, a new confusion may now be looked for, namely, the relative evanescence of glycerinated calf lymph vaccinal cicatrices. In many cases, even where vesicles were "very good" or "excellent," the cicatrix at the end of a year has been found barely perceptible. Probably, therefore, as one result of the intensive criticism recently applied to vaccination, the quality and size of the cicatrix will cease to be the predominant sign of "good" vaccination.

3. *General and administrative papers.*—Among the most interesting general papers in the 1898–99 Report is Dr. Bruce Low's "Report upon the Progress and Diffusion of Bubonic Plague from 1879 to 1898." This paper of sixty closely printed pages collates all the main geographical facts of the last ten years of plague, and, in the 1899–1900 Report, Dr. Low continues the laborious record, and also details the measures taken with individual vessels at English ports. These articles, therefore, become a valuable addition to administrative and pathological history. There are many administrative reports, which, as public health "case-records," afford much material for comparative study. Dr. Bruce Low's investigation (1898–99 Report) of the Camborne outbreak of enteric fever is a typical example of a conclusive local research. Dr. Theodore Thomson's "On Enteric Fever and the Sanitary Circumstances and Administration of the Swinton and Pendlebury Urban District," is another admirably developed object-lesson in practical hygienics. Dr. Bulstrode's report on Windsor (1899–1900 Report) is another good example of what a thorough-going investigation should be. "Enteric Fever in the City of Chichester," by Dr. Thomson and Colonel Marsh, adds yet another to these studies of enteric epidemiology. Bolton, Aldershot, Falmouth, also became prominent in the latest report.

4. *Research.*—The chief investigations of the 1898–99 Report are Klein's on the *B. enteritidis sporogenes*, Klein's report "On the Fate of Pathogenic and other Infective Microbes in the Dead Animal Body," Dr. Sidney Martin's "On the Growth of the Typhoid Bacillus in Soil," Dr. Houston's "Inoculation of Soil with Typhoid," the "Bacteriology of Scarlatina" by Dr. Gordon, and the "Histology of Vaccinia" by Drs. Copeman and Mann. Klein's problem is the relation of the *B. enteritidis sporogenes* to enteric fever. His general experimental conclusion is "that a previous injection of the guinea-pig with culture of *B. enteritidis* distinctly increases the susceptibility of this animal to subsequent typhoid bacillus infection. It appears, then, that a previous subcutaneous injection with typhoid culture decreases the susceptibility of the guinea-pig to the subsequent infection with *B. enteritidis.*" His conclusions on post-mortem infectivity are distinctly reassuring. "Direct experiment lends no confirmation to the general and popular belief that the microbes of infectious disease retain their vitality and power of mischief within dead and buried bodies for indefinite periods. On the contrary, these researches show that, as far as the bodies of the guinea-pig are concerned, the vitality and infective power of those microbes that have been made the subject of experiment passes away in a comparatively short time; that in most cases a month is sufficient for this result; that is to say, long before the coffins containing the buried bodies have shown any indication of leakage. A like result is, however, observed in the case of bodies buried directly (wrapped in a piece of fabric) in earth or in sand. In this case it may be inferred that the vitality and infectiveness of the pathogenic microbes contained in the viscera has passed away long before the outer skin has become permeable by them; and, further, the operations of putrefactive microbes, affecting

their destructive processes from without, would be likely to prove a powerful and perhaps efficient barrier for such passage outwards of pathogenic microbes." The causes of this rapid demise of pathogenic microbes remain to be investigated. The pathogenic microbes experimented with included those of Asiatic cholera, enteric fever, diphtheria, plague, tuberculosis, *B. enteritidis sporogenes*. These and the related researches of Dr. Sidney Martin and Dr. Houston are beginning to afford a definite scientific basis for the caprices of enteric fever infection, its capacity for resuscitation, and its clinical varieties. In his further research on "Washings of Soils," Dr. Houston makes an important contribution to a much agitated question, of the first importance practically, namely, the relation of chemical to bacteriological impurity of water. "The results obtained in this inquiry clearly show that chemistry cannot always be relied on to detect in a water supply the presence of 'flood water' of objectionable or dangerous sort. It is true that some of the 'soil waters' in question would have been condemned on chemical analysis; but it is also evident that the 'washings' from some soils of unobjectionable character yielded higher results (chemically as regards organic matter) than those known to be grossly, and perhaps dangerously polluted." To establish this on a definite experimental basis is of the highest value for hygienic practice. The same problem is further investigated by Drs. Klein and Houston in a report "On Bacteriological Evidence of Recent, and therefore Dangerous Sewage Pollution of elsewise Potable Waters." The conclusions are very definite: Bacterioscopic examination can detect "gross pollution" when chemistry fails, and that "when the degree of sewage pollution of the water is from ten to one hundred times less than that in which the organic matter contributed by the sewage to the water has failed to get recognition by the methods commonly in use by the chemist."

In the 1899–1900 Report, the same researches on soils and scarlet fever are continued. Dr. Klein has an elaborate report "On the Pathology and Etiology of Pseudo-tuberculosis." Dr. Gordon's conclusion, after his long research on scarlet fever, is this: "The further characters of *Streptococcus scarlatinæ* or *conglomeratus* (Klein) described in the present report, the result of a bacteriological investigation of ten fatal examples of scarlatina, and of a comparison between *Streptococcus scarlatinæ* and thirty specimens of *Streptococcus pyogenes*, emphatically support the view that *Streptococcus scarlatinæ* or *conglomeratus* is the specialised (he avoids the term 'specific') and essential agent of that specific infection known as scarlatina or scarlet fever."

Several other researches and compilations in these valuable Reports deserve detailed notice; but those already noticed must be accepted as types. The specialist will have these Reports always at his hand; the brief notes I have given will remind the "generalist" that he too may with profit consult them on occasion.

It would not be proper to end without a note of Dr. Power's reference to his late chief:—"The year 1899 will be ever memorable in the annals of the Medical Department by the loss of its principal officer, Sir Richard Thorne, K.C.B. He died suddenly, actually in harness, on the 18th December." *Frater ave atque vale!*

W. LESLIE MACKENZIE.

The Treatment of Fractures. By CHARLES LOCKE SCUDDER, M.D., Assistant in Clinical and Operative Surgery, Harvard University Medical School; assisted by FREDERIC J. COLTON, M.D. Second Edition, Revised. Philadelphia and London: W. B. Saunders & Co. 1901.

"THIS book is intended to serve as a guide to the practitioner and student, in the treatment of fractures of bones," and, we believe, will in many respects meet the requirements of those to whom it is addressed.

We are entirely with the authors in their advocacy of "mechanical simplicity" in the treatment of fractures, as well as in their disparagement of the use of "splints of special manufacture," although, in the latter case, not for the reason they give—"that their use distracts attention from the fracture"—but rather because we never find that they fit. We do not place the same value on plaster of Paris "in the treatment of almost every fracture," as the authors do. In many fractures it is of undoubted value, but it is open to the objection that it prevents the early and systematic employment of massage and movement—factors the value of which the authors seem to us imperfectly to appreciate.

The first chapter—on fractures and pistol-shot wounds of the skull—is, we think, out of place in a work such as the present. It is impossible to discuss the treatment of fractures of the skull without giving full consideration to the intracranial complications by which it is governed. In their attempt to condense this discussion, the authors have given us so much material for adverse criticism that space forbids that we should enter into it.

The chapter on fractures of the facial bones and jaws is much more satisfactory, but the authors scarcely keep their promise, not to describe "splints of special manufacture;" as we find no fewer than sixteen illustrations of such splints in this short section.

The sections devoted to fractures of the extremities are of much greater value than those which precede them, both with regard to the text and the illustrations. And here we may remark that we have seldom met a work so lavishly, and on the whole so admirably illustrated as that now before us. The body of the text extends to 430 pages, and includes no fewer than 611 illustrations, of which, however, a few might easily have been dispensed with, for example, Figs. 13, 20, 24, 133, 392.

We find fewer radiograms reproduced in these pages than in most recent works on fractures—a circumstance, however, with which we do not find fault; but the authors have introduced a great many tracings of radiographic plates. We confess we have not found them instructive. We have, however, nothing but praise for the photographic reproductions, and for most of the drawings throughout the work. The former reach the high standard of excellence with which American authors and publishers have made us familiar, and this is sufficient praise.

We cannot leave this book without making reference to its literary style, which, we may say at once, is about as bad as it could be. Every page abounds in solecisms. The authors repeatedly employ the future tense when they should use the present; they constantly obscure their meaning by transposing their sentences; and they persistently misuse the most ordinary English words.

To take a few examples at random: On page 30 we are told that "Alcoholic delirium will present an elevated temperature, but along with the elevated temperature of a lacerated brain there will be symptoms characteristic of a damaged brain." Again, on page 32, in referring to the diagnosis of head injuries, the authors say: "An unconscious man having a scalp wound and a breath smelling of liquor is not necessarily drunk." Among the general symptoms of brain injuries are included, in one clause, "irritability in temperament and in muscle." In describing the after-treatment of fracture of the clavicle in children, we are told that "in warm weather, and also in cool weather for that matter, the arm is to be inspected frequently, as often as every third day, when all the dressings are removed, the parts bathed with soap and warm water, powdered, and the simple retentive dressing reapplied." The weather clearly has nothing to do with it. Under the heading "Hæmorrhagic Internal Pachymeningitis"—which, by the way, seems to us to have very little to do with the treatment of fractures—we are informed that in the course of this disease the patient has intervals of comparative health, and that "during these intervals of comparative health the patient has some headache, slight diminution of intelligence, impairment of memory, drowsiness, partial paralysis of the limbs (usually unilateral), disturbances of speech, and sudden mental excitement without cause, mixed with symptoms of paralytic dementia." Verily "health" is a relative term. ALEXANDER MILES.

The Gross and Minute Anatomy of the Central Nervous System. By H. C. GORDINIER, A.M., M.D., Professor of Physiology and of the Anatomy of the Nervous System in the Albany Medical College. London: Rebman Limited.

THIS book, like other recent publications on kindred subjects, has been written, owing to "the absence of a complete work in English on the Anatomy of the Central Nervous System"; and the endeavour of the author to "present this most difficult subject in a concise but comprehensive manner" has been very successful. It is doubtful, however, whether the writer will meet with the reward he deserves, as the medical student, for whose use the work has been prepared, will probably still prefer to obtain his knowledge of the anatomy, histology, and physiology of the central nervous system from the various sources to which he has been accustomed to apply in the past. The book should, however, be of considerable assistance to the clinician, owing to the conciseness of the descriptions and the careful distinction which is drawn between the known and the probable, although it will be of less value to those engaged in original research.

The work begins with a concise but good account of the intimate structure of the nerve cell. This is followed by a description of the various forms of cell process, nerve fibre, and fibre termination. The last includes a satisfactory account of the structure of the muscle spindle. This section is concluded by an excellent general description of the neurone, and by satisfactory references to the neuroglia and the cerebral blood vessels and lymphatics. The illustrations as a whole are good, but those showing Nissl bodies are very poor, and Fig. 8, a micro-photograph of small pyramidal cells, is placed upside down, and not intentionally so, for it is repeated the right way up on p. 345. This part of the book is as a whole excellent, but it is obviously written for students, owing to its dogmatic character. The neurone theory, for example, is taught without any reservation, as is also the purely epiblastic origin of the neuroglia.

This section is followed by a good general description of the spinal cord. The account of the different tracts of fibres is especially good, and here, as elsewhere in the book, whilst the author is most dogmatic about accepted facts, he invariably introduces names where dealing with doubtful points or special views. In the illustrations it is a pity that the writer does not place the different sections of spinal cord the same way up; and this remark might be made with reference to succeeding sections of the work.

A good and clear description, considering the complexity of the subject, is next given of the structure of the bulb. Useful summaries are here and there introduced, *e.g.* the connections of the hypoglossal nuclei and of the vestibular nerve, and the source of the fibres composing the restiform bodies. The account might perhaps have been easier for the student to follow if the writer had introduced a few diagrams, for example, of the connections of the eighth nerve, etc.

The cerebellum is next treated, both macroscopically and microscopically, in a most satisfactory manner. The description is well illustrated, but there is, however, no picture of the roof nuclei. In the account of the histology of the cortex the relation of the neuraxones of the inner granule cells to the Purkinje arborisations is not clearly expressed, and cannot well be understood by the student, especially as in the illustrations the direction of the sections in relation to the laminæ is not stated.

The remainder of the description of the parts below the cerebrum is equally good, and contains an especially clear and full account of the structure and connections of the optic thalami and subthalamic nuclei. Very good descriptions of the histology of the corpora quadrigemina and of the retina are also introduced. An error has occurred in Fig. 128 or Fig. 131, for these micro-photographs are identical, although the former is said to show the stellate cells of the optic thalamus, and the latter the cells of the red nucleus.

The writer then deals with the anatomy of the cerebrum. Exceedingly clear but not very detailed descriptions of the fissures and the convolutions are given, and these are followed by an excellent account of the olfactory lobe and tracts. The histology of the cortex cerebri is good, but the author has copied the somewhat misleading schemes of Déjerine, which, from a student's point of view, tend to cause confusion by accentuating differences of opinion on the part of the several authors, instead of minimising them. Many of such differing descriptions are probably due to the several authors having illustrated different regions of the cortex, or different parts of the convolutions. A full description of the histology of the cornu ammonis is given, but no reference is made to the various types of lamination found in other regions of the cortex, which is a rather serious omission. The association and projection systems of the cerebrum are clearly described, and a good account is given of the general anatomy of the interior of the hemispheres. This section closes with an excellent description of the blood vessels of the brain, the account of the venous system being especially good.

The next section, which deals with cerebral localisation, is the best article in the book, and could hardly be better written in the present state of our knowledge; and the distinction made throughout between the known and the probable is very satisfactory.

The embryology of the central nervous system is then clearly, fully, and satisfactorily treated, and the work closes with a short chapter on the technique of the examination of the brain and spinal cord. This last chapter is not entirely beyond criticism. Whilst the descriptions of the Nissl, Bevan Lewis, Golgi, and original Weigert methods are good, no reference is made to the modification of the last which was introduced by Schäfer, and which is in such common use in this country. The Weigert method is also described as "a unique method of staining the myelin sheath, which has become classic," instead of a method of mordanting and staining long fibrils, of complex metabolism, and medullated or otherwise, which are surrounded by supporting tissue of lower metabolism, and therefore less readily mordantable, the relatively free surrounding lake being afterwards removed by oxidation. The author also does not state the hardening methods to be used prior to staining with carmine or nigrosine. The remaining methods referred to are fairly well selected and clearly described.

The book, as a whole, is an excellently written students' manual. The descriptions are clear and interesting, and unnecessary detail, which would interfere with the general grasp of the subject, is omitted. The general style is English rather than American, though a few American modes of spelling, *e.g.* "fetal," "fiber," "chemic," "disproven," "sickel," etc., are introduced. One or two errors exist in the names of authors, *e.g.* "Russel" for Russell, "Monk" for Munk. There are also the usual number of letterpress errors, *e.g.* "distant" for "distinct" (p. 111), "red" for "dentate" (p. 204), etc. The index is excellent, but there is no bibliography, although numerous authors are referred to in the text. The illustrations are numerous and, as a whole, good, and many of the best are copied from standard works. They are also frequently repeated where the exigencies of the text require it. Whilst many of the original micro-photographs are excellent, a number of the remainder appear to show very little, even to the initiated observer. J. S. BOLTON.

Hygiene and Public Health. By LOUIS PARKES and HENRY KENWOOD. London: H. K. Lewis. 1901.

THIS book is practically a new edition of Louis Parkes' hand-book, with the same title, which during the last ten years has enjoyed a well-deserved popularity.

The present volume is, however, much larger, and its substance has been recast and brought up to date, under the joint authorship of Parkes and Kenwood. It is an eminently readable volume, the style being clear and simple, while technical terms have been avoided so far as possible, so that it will appeal not only to those possessing a medical training, but also to others who desire accurate and authoritative information upon public health questions.

The chapters on "Water," "Refuse Disposal," "Ventilation," and "Warming" are all treated in a lucid manner, and the account given of communicable diseases and their prevention is especially practical and valuable as a reliable résumé of our present knowledge of the subject. The theory and practice of disinfection, and statistics, are both well described, while the section on "Sanitary Law" presents an admirable epitome of this important though somewhat dry subject.

Altogether, the book forms an admirable text-book for the student, and will also be found an accurate and useful guide to the medical practitioner in all public health questions. HARVEY LITTLEJOHN.

Practical Guide to the Public Health Acts. By THOMAS WHITESIDE HIME. Second edition. London: Baillière, Tindall & Cox. 1901.

THE title of this volume conveys but an imperfect idea of its scope. It contains not only all the Acts of Parliament bearing on public health, well classified and carefully edited, but also valuable notes upon them, and an appendix of illustrative decided cases. In addition, there is a mass of general information upon various subjects related to sanitary administration, which will prove of the greatest value to executive health officers.

It is impossible to enumerate all the matters thus referred to, but amongst them are the various official memoranda in regard to cholera, smallpox, vaccination, etc., and an account of the International Sanitary Conferences. The Model Bye-laws of the Local Government Board are also given, while there are very full and useful hints upon statistics, meat inspection, hospitals for infectious diseases, the prevention of tuberculosis, analytical memoranda in regard to various kinds of food, and many other subjects.

The detailed tables of contents, Acts of Parliament, and cases cited, as well as a copious index, add very greatly to the value of the work.

It is to be regretted that the author has not included a consideration of the Scotch Public Health Act, which in some respects is in advance of English legislation, and which by its inclusion would have rendered the book more complete and useful to those residing north of the Tweed.

There are some matters which we think might well have been referred to more fully, and others, the consideration of which could have been dispensed with; but we have no hesitation in commending the book to all medical officers of health and inspectors of nuisances, as a storehouse of facts and a reliable *vade-mecum*.

HARVEY LITTLEJOHN.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF
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Adipositas Dolorosa.

The authors of these papers (Achard et Landry, *Gaz. hebd. de méd.*, Paris, 1900, No. 37; Debove, *Presse méd.*, Paris, July 17, 1901) base their remarks upon the same patient. Adipositas dolorosa is a rare disease, first individualised by Dercum in America in 1888. It is characterised by two chief symptoms: the first, *objective*—more or less symmetrical deposition of adipose tissue in certain more or less definite portions of the body; and the second, *subjective*—intermittent attacks of pain, experienced in the regions implicated by the fatty deposits. All the cases hitherto reported have occurred in females. The name "adipositas dolorosa" is preferable to "the malady of Dercum," for in truth medical nomenclature is already encumbered with far too many personal titles applied to special forms of disease.

The patient in question, a female, was æt. 80; had had typhoid when 33, acute pneumonia when 38. She was neither alcoholic nor syphilitic; had always led a very active life. Her age agrees with former experience; a preference for adults and the aged, rather than for the young, having been exemplified by all previously recorded cases, except Hale White's female patient of 22, in whom the first symptoms developed at the early age of 12 years. No hereditary influences could be traced; both her parents died at an advanced age, while neither had ever shown any signs of the disease—an important diagnostic fact, because this painful obesity has hitherto been found to be unassociated with heredity, unlike the majority in the more vulgar type of adiposity.

In many previously recorded cases traumatism has been alleged to have constituted the apparent original cause of the disease, nor was this case an exception to this rule, for, fifteen years before the date of examination into her symptoms, she had injured her left thigh by a fall; this injury being followed by development of a tumour in that part, which was removed by operation.

It is possible that the rôle of traumata in the causation of the disease is more of an incidental character than constant. However this may be, the fall in this patient was followed by attacks of pain and of hæmorrhage. The pains were at first localised in the lumbar region and the left thigh, spreading later to the other leg. Although these pains recurred paroxysmally, at short intervals from the date of the injury cited above, it was only one month before admission to hospital that they became so intense as to render her incapable of pursuing her daily duties and work.

Examined clinically, the deposits of fatty tissue proved to be exquisitely tender on pressure, as well as subjectively painful. These pains were incited by muscular contractions, and by walking; they seemed to radiate from the adipose masses, independent of the position and course of nerves. Do these pains precede or follow the adiposity? It is difficult to say. Patients naturally are cognisant of the onset of pain before they take note of the increase of fat. In most the pains are stated to antedate the obesity; in a few the converse. In this patient the pains were first noticed. When examined she weighed 12 stone, 8½ lb., although only 4 ft. 10½ in. in height; the fatty masses were unequally distributed over each side of the body, but presented a more or less symmetrical relationship between one side and the other. Both feet were normal; both malleoli in each side were obscured by adipose masses; and in the upper quarters of the legs and in both thighs similar deposits occurred; more pronounced posteriorly than in front. The abdomen and lower half of the thorax were likewise invaded; the upper part of the thorax, the neck and face, were unaffected. The condition of the arms corresponded to that of the legs.

The fatty masses appeared homogeneous to the eye; but, to touch, proved to consist of diffuse nodular masses. The localised deposits of fatty tissue differed from the symptoms afforded by the occurrence of pain, in that they were practically constant, the pain paroxysmal, and associated with periods during which it was entirely absent. If, however, this patient is to be believed, even the adipose additions undergo periodic variation.

Prognosis in such cases is grave; not so much with regard to life itself, but as to recovery from the distressing symptoms. Death usually results from some intercurrent disease.

Pathologically, little is certain. The fatty masses show no divergence from normal adipose tissue; the thyroid gland has been described as the seat of abnormal conditions, but these, as recorded, are variable and banal. Dercum found the large nerve trunks healthy, the peripheral fibrils atrophied; but the symptoms of the disease do not correspond to those of peripheral neuritis. Is it an aberrant type of myxœdema? No; for the condition of the thyroid gland fails to support this theory, while the mental powers are not implicated, nor the hair similarly affected. In attempting to account for the symptoms illustrative of adipositas dolorosa, one is met with the difficulty presented by the partial distribution of the fatty increments, and of pain; it may be explained, perhaps, by premising a system of regulation of nutrition of the body, local lesions of which originate local lapses from normal metabolism on the part of the cells of the tissues concerned, while at the same time these lesions incite local painful sensations, and render the nerve fibrils implicated painfully sensitive to pressure.

As to treatment, thyroid preparations may be tried, but have as yet proved of little use.

The first two authors, it may be added (for the abstract is largely based upon the second paper), state that disturbances of sensibility, atrophy of muscles, or their partial hypertrophy (as in the hand), falling out and degeneration of the hair, herpes zoster, and psychical disorders accompany and complicate adipositas dolorosa; contradicting in part what the third authority voices.

Another point may be alluded to, unwittingly omitted from the above, the frequent association of hæmorrhages with dolorous obesity,—metrorrhagia, as in the patient here discussed, appearing at the age of 65, seventeen years after cessation of menstruation, and continuing up to the age of 77; spontaneous ecchymoses, as also in this case; and blood blisters, are to be met with in many of the victims of this malady.

OBESITY AND NARCOLEPSY.

SAINTON (*Gaz. hebd. de méd.*, Paris, 1901, No. 34) remarks that torpor and somnolence are frequently met with in the above; less often with narcolepsy, or, as it is also termed, hypnolepsy. He details the case of a man, æt. 43, very stout, who had been visited by attacks of narcolepsy whenever the deposition of fatty material reached high water, or rather high fat, mark; associated strangely enough by concomitant sleeplessness. Under appropriate measures both symptoms disappeared. The patient presented no signs of diabetes, albuminuria, nor epilepsy. Sainton suggests that the phenomena of narcolepsy arose in his case from auto-intoxication. The stout are wont to enjoy the pleasures of the table, nor are they, as a rule, averse to rich foods, rich in toxine capabilities as well as in chemical constitution. Whenever his patient restricted and simplified his usual scheme of diet, he lost flesh and his narcolepsy, while true sleep returned.

SYPHILIS OF THE STOMACH AND INTESTINES.

(Referred to *Centralbl. f. innere Med.*, Leipzig, June 29, 1901.)

A MAN, æt. 51, three months before death, received a blow on the epigastric region; thereafter suffered from pain, vomiting and hæmatemesis, melæna, and later loss of appetite. Scheib (*Prag. med. Wchnschr.*, 1900, Nos. 45–46) details his condition on admission to Pribram's clinique; he presented symptoms and signs of bronchitis, complained of painful sensations in the lower abdomen, partly relieved on going to stool. In course of time his temperature rose, pleurisy set in, followed by hæmoptysis, collapse, and death. The sectio revealed half a litre of blood between stomach and liver and stomach and spleen; a perforating ulcer, funnel-shaped, but with the base outwards, of the fundus ventriculi next the spleen; a necrotic area in the pyloric region; eight similar areas in the duodenum, some of them perforated but sealed by adhesions, and some in the jejunum and cæcum. Numerous growths studded the tissue of the lungs, some as large as hen's eggs.

Microscopic investigation of the growths and diseased parts failed to demonstrate the presence of either tubercle or typhoid bacilli, nor cellular appearances, characteristic of lesions due to these organisms. Further, many blood vessels were markedly affected by endarteritis proliferans—*ergo*, the case was syphilis of the visceral type.

Einhorn (*Arch. f. Verdauungskr.*, Berlin, Bd. vi. (2), S. 150) separates syphilitic affections of the stomach into three forms—ulcerative, gummatous, and pyloric-constricting. He gives typical examples of each condition, and opines that they occur more frequently and are of more importance than the profession appears to be aware of.

SYPHILITIC FEVER.

OSLER and Musser, in respective works on medicine, insist on the importance of bearing in mind, in cases of fever of obscure origin, that syphilis may give rise to pyrexia, a long time after all the acute classical symptoms of the disease have disappeared. Many such cases, Futcher (*N. Y. Med. Journ.*, June 22, 1900) remarks, are treated on the supposition that they belong to one or other of the acute infective fevers. Lines of treatment based upon these grounds are naturally ineffective; and, such being the case, careful examination should be made for some evidence of past syphilis—in the bones, skin, or viscera. More satisfactory still is the test *ad hoc;* the exhibition of anti-syphilitic remedies, with the invariable positive or negative answer, very shortly obtained by the fall or persistence of the pyrexia. The writer's dicta are best given in his own words:—"Syphilitic fever may occur at various periods during the course of the infection. (1) It may occur, in very rare instances, three or four weeks before the onset of the secondary skin eruption. This early fever is puzzling, and is likely to be attributed to some other cause until the eruption makes its appearance. (2) It may precede or be coincident with the appearance of the secondary eruption. This is the so-called 'fever of invasion,' and it is a very common and important symptom of secondary syphilis. (3) The fever may occur at any time during the course of the secondary or tertiary stages. The late occurrence of the fever is the most interesting feature. In Case 3, for instance, it occurred twenty-nine years after the disease was contracted.

"The 'fever of invasion' is rarely absent at the onset of the secondary symptoms. It is sometimes wanting, however. It usually precedes the appearance of the secondary eruption by a week or ten days. Rarely does it antedate the eruption by more than two weeks. Practically all authorities now agree that this fever is a symptom of the invasion of the system by the organism believed to be the cause of syphilis, or by its toxic products. At an earlier date some observers were inclined to attribute it to some coincident infection. The height of the fever varies greatly in different cases. It may only be moderate, not reaching above 101° F. On the other hand, the daily elevation may be much higher, the afternoon temperature reaching as high as 104° to 105° F. The fever of invasion, as well as the syphilitic fever associated with the late manifestations of the disease, may present any one of the following three clinical types of fever:—(1) A mild continuous pyrexia, where the temperature ranges in the neighbourhood of 101° F. Osler states that this type is not uncommon in the fever which ushers in the constitutional symptoms. (2) A remittent type of fever, with morning drops toward normal and evening exacerbations. This, as already stated, is considered the usual character of the fever of invasion. (3) A definite intermittent fever. This is the most remarkable form of all, and is the type which is most likely to lead to error in diagnosis. Syphilitic fever, although usually a secondary manifestation, may occur late in the disease. The febrile diseases for which such a fever is only too often mistaken are malarial fever, typhoid fever, tuberculosis, and sepsis. Where general pains and joint pains accompany the fever, the diagnosis of rheumatism may be made."

After giving details of these cases typical of syphilitic fever, as met with in Osler's wards in the Johns Hopkins Hospital, Baltimore, he concludes by recapitulating his points, thus—"(1) In all cases of fever of obscure origin, the possibility of it being syphilitic should be borne in mind. (2) Experience has shown that physicians of reputation, as well as those of limited experience, are prone to mistake the condition for one of the acute specific fevers. (3) The affections for which syphilitic fever is most often mistaken are malaria, typhoid fever, tuberculosis, sepsis, and occasionally rheumatic fever. (4) The fever may occur as early as four weeks previous to the appearance of the secondary skin eruption, or, what is of greater importance, late in the disease, after tertiary manifestations have existed probably for years. (5) The fever may be continuous, remittent, or intermittent. The remittent type is regarded as the most frequent form in the fever of invasion. The fever is often associated with chills and sweating. (6) Careful examination of the long bones and viscera, or evidences of tertiary lues, should be made in all cases of fever of obscure origin."

SURGERY.

UNDER THE CHARGE OF

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Pathogenesis and Treatment of Keloid.

The majority of observers hold that keloid and hypertrophied scars take origin in the corium, that keloid consists of rigid, thickened collagenous bundles without elastic fibres or medullated nerves, and that its surgical treatment is hopeless.

Goldmann has come to the conclusion that the primary factor in the production of keloid is the damage sustained by the elastic elements of the skin, whether as a result of injury—in subcutaneous or open wounds—of acute infective inflammations, such as acne pustules or boils, or as the result of burns or the application of caustic substances. The elastic fibres are damaged and are not reproduced; in keloid this occurs in the reticular portion, in hypertrophied scars in the papillary portion of the skin, so that there is a permanent disappearance of elastic fibres in these respective situations. In the later stages of keloid, elastic fibres are extensively reproduced in the papillary portion, but there is no trace of them in the deeper layers of the skin. While hairs and skin glands are absent in keloid, they may be present in an unchanged condition in hypertrophied scars. The author has found medullated nerve fibres in keloid. The disappearance of the elastic fibres diminishes the resisting power of the skin, and the connective tissue fibres undergo compensatory hypertrophy. The treatment of keloid consists in excision, followed by Thiersch grafting, and this may prove successful when all other methods have failed.

SHOULD IODOFORM BE USED AFTER OPERATIONS FOR LOCAL TUBERCULOSIS?

SINCE it has been shown that iodoform is not an antiseptic, the beneficial influence which it exerts in tuberculous lesions is generally ascribed to its specific action on the tissues. Fränkel has made comparative investigations on wounds treated with iodoform and on wounds treated with insoluble and indifferent powders, such as bone charcoal. The histological changes were found to be really the same in both sets of wounds. Sterile indifferent powders stimulate the tissues and excite the fixed cells to proliferate and to form fibrous tissue and phagocytic giant cells. The giant cells are found grouped around the iodoform crystals or the particles of charcoal. Iodoform has no specific action in tuberculous lesions; its action depends partly on the bacteria which may be introduced along with it, and partly on its mechanical influence as a powder. The latter is the most important action in tuberculosis, and it may be equally well brought about by non-poisonous substances. In the treatment of wounds after operations for local tuberculosis, Fränkel has therefore substituted for iodoform *a purified and sterilised animal charcoal,* which is used either in the form of an emulsion in glycerin or as a powder which is rubbed into the surfaces of the wound, or is used as a packing with gauze.

The results obtained are quite as satisfactory as when iodoform is employed. The most successful healing by first intention followed in those cases where the skin was not involved, and where the wall of a tuberculous abscess was completely eradicated, the charcoal powder rubbed into the raw surfaces, and the skin wound closed by sutures. Where the skin was involved, and the cavity of the wound was stuffed with sterile charcoal gauze, the results were equally satisfactory. Fränkel demonstrated the structure of the wall of a cold abscess which had been treated by the injection of charcoal glycerine, the changes being the same as those described after treatment by iodoform. The pyogenic membrane is replaced by a richly vascularised granulation tissue in which the carbon particles are embedded. The bone charcoal must be absolutely pure, and must be sterilised immediately before use.

RESECTION OF THE GASSERIAN GANGLION FOR TRIGEMINAL NEURALGIA.

KRAUSE records his own experience of this operation, based on twenty-seven cases. As regards the operation itself, the technique is the same as recommended by him in 1892. He prefers to tie the middle meningeal artery, but if the ligature slips or the vessel tears across, the bleeding is controlled by pushing into the foramen spinosum, a hook, the point of which is bent at a right angle. The hook is removed at the end of the operation, and if the bleeding recurs, a small strand of gauze is used to plug the foramen, and is removed after a day or two when the dressings are changed. It is best to complete the operation at one sitting, and this was accomplished in twenty-six cases. In one case the patient was so collapsed that he had to stop after tying the meningeal artery, the operation being completed four days later. The duration of the operation depends on the amount and persistence of the hæmorrhage, as it may be necessary to interrupt the proceedings and plug the wound with gauze until it is arrested, in order to be able to see what one is doing. The average duration was one and a half hours, the shortest being twenty-five minutes, and the longest three hours. In patients who are much run down, a little time may be saved by sacrificing the flap of bone, and although this is attended with marked depression of the scar in the temporal region, it is not followed by any untoward symptoms. The ages of the patients ranged from 30 to 72 years. There were eighteen women and seven men. Three patients died,—one of collapse a few hours after the operation; another, a man, æt. 72, of a severe heart lesion six days after the operation; and the third, twenty days after, without there being any cause of death discoverable on post-mortem examination. There was no sign of septic infection in any of the cases which terminated fatally. In two of the successful cases, the bone flap necrosed and separated. So far as the risk to the eye is concerned, it would appear that it is only in the first few weeks after the operation that special care is necessary. Even where a corneal ulcer formed, it healed readily under the usual treatment. Cerebral symptoms, such as restlessness, apathy, somnolence, and headache, were exceptional and evanescent. Temporary aphasia was observed in two cases. So far as the cure of the neuralgia is concerned, Krause has not observed a single case in which there was a relapse after the operation, although in five cases an interval has elapsed ranging from six to eight and a quarter years. In three cases, all of them being females, neuralgic pains developed on the other side. Krause is very emphatic in refusing to operate in cases of hysterical or neurasthenic neuralgia, as in these no benefit can be expected. Among the less important sequelæ of the operation, there is sometimes complaint of formication, of burning, or of numbness in the area of distribution of the fifth nerve.

FURTHER OBSERVATIONS ON GOITRE BY KOCHER OF BERN.

KOCHER has now completed a second thousand operations for goitre. The operative treatment is indicated not only in those which interfere with respiration and in the malignant forms, but in a large number of colloid and cystic goitres which do not yield to other methods. There were six deaths in twenty-seven cases of malignant disease, this high mortality being due to the severity of the operation, especially where this included resection of the trachea or œsophagus; two deaths in twenty cases of thyroiditis, and two deaths in twenty-four cases of Graves' disease. In 929 cases of innocent goitre there were only four deaths, three of them from preventible causes, one of corrosive sublimate poisoning, one of acute myxœdema, and one from chloroform. As regards the technique of the operation, the routine procedure is to excise one half of the gland under cocaine anæsthesia and with strict asepsis. From the surgical point of view, the *intrathoracic goitre* (struma occulta) is one of the most difficult to deal with. The existence of the goitre is often quite unsuspected, and the patient is often treated for asthma, because of the paroxysmal attacks of breathlessness and because of the coexistence of emphysema and bronchitis, and of heart complications. In some cases of "hidden goitre" the clinical features are those of a mediastinal tumour, with engorgement of the great veins, or those of tracheal stenosis from compression of the air passage within the thorax. It is useful to differentiate between *the movable* and *the fixed forms of intrathoracic goitre.* In the former the patient may be able by violent expiratory efforts to project the tumour upwards into the neck, and the operation for its removal is not so difficult. The fixed ones, on the other hand, can only be diagnosed with certainty by means of percussion and by skiagraphic examination of the chest, together with a careful interpretation of the symptoms and signs, namely, the severity of the dyspnœa, the unexplained displacement of the trachea to one or other side, the feeling of resistance and sometimes of pulsation in the jugular fossa, and the signs of paralysis of the recurrent laryngeal and sympathetic nerves. Kocher has operated in twenty-two cases of intrathoracic goitre, and in spite of the critical nature of the undertaking it was quite successful in all of them.

Although impressed with the necessity of improving the technique in the operative treatment of goitre, Kocher and his assistants have been engaged for some years with its *medical treatment*, and especially in observing the results of *the administration of phosphorus.* When phosphorus is given internally, the amount of iodine constituents in the thyroid is increased to a much greater degree than by any form of iodine treatment. Contrary to what has generally been believed, the functional activity of the gland is diminished in goitre; in the ordinary form the products accumulate in the gland itself, while in the exophthalmic form they gain access to the general circulation. The phosphorus is given pure in the form of tabloids, very much on the same lines as in rickets.

THE RESULTS OF CASTRATION IN TUBERCULOSIS TESTIS.

THERE is a growing tendency to abandon castration in favour of conservative operations in the treatment of testicular tuberculosis. The chief arguments urged against castration are three in number. First, that the removal of the whole testicle is unnecessary, because the disease nearly always commences in the epididymis, and may therefore be got rid of by clearing out the individual foci of tubercle or by excising the epididymis. Secondly, that the removal of the whole testicle is not curative, because other parts of the urogenital apparatus are also diseased, the idea being that the tuberculous infection has descended from the kidney or prostate. Experience shows, however, that the disease is often primary in the testis and confined to it, or, having commenced in the testicle, it may spread upwards along the cord, both of which facts are of great importance in relation to treatment by castration. Thirdly, that the removal of both testicles should be abandoned, because of its injurious influence on the mind and on the organism as a whole, and also because where both testicles are affected, the urinary organs, prostate, and seminal vesicles are very frequently the seat of tuberculosis.

Von Bruns disputes these arguments, and submits the following statement of the results of castration, derived from cases which have been under treatment in the clinique at Tübingen during the last fifty years. There were 111 cases altogether, seventy-eight of unilateral and thirty-three of double castration. Of the former, 12 per cent. died of genito-urinary tuberculosis; 15 per cent., of tubercle of other organs; 26 per cent. became the subject of disease in the remaining testicle, which was then also sacrificed. No less than 40 *per cent. were permanently cured after unilateral castration*, the patients having been kept under observation for from three to thirty-four years. Of the cases of double castration, 15 per cent. died of urogenital tuberculosis, 25 per cent. died of tuberculosis of other organs, and 56 *per cent. were permanently cured*, the patients being under observation for a period varying from three to thirty years. Mental disturbances were never observed. These figures show that castration is permanently curative in about one-half of the total cases, in those namely in which the disease is confined to the testis. The remainder who suffered from coexisting tuberculosis of the urinary or other internal organs nearly all died, a result which cannot be attributed to the castration. The results of conservative operations are not known for certain, but they are probably much inferior because of the frequency of local recurrence.

Von Büngner advises that in all cases of castration for tubercle, the vas deferens should be divided or torn across at the highest possible level, and states that this procedure has yielded very excellent results in his own practice. Where the disease already affects the prostate and seminal vesicles, it should be eradicated by a perineal or parasacral operation. As this procedure is a formidable one, he has recently adopted a method whereby iodoform glycerin emulsion is injected into the vas deferens after dividing this tube at the external ring in the usual operation of castration; the iodoform is driven along the vas into the seminal vesicle of the same side.

Simon reported from the clinique in Heidelberg that during a period of twenty-seven years 107 patients had been subjected to castration for tuberculosis testis. Of those who were capable of being traced, fifty-nine were alive and thirty-three had died, tuberculosis accounting for twenty-six of the deaths.

In many cases, the removal of the diseased testis was followed by decided improvement in tuberculous disease elsewhere in the body, and especially in pulmonary consumption. Improvement in tuberculous disease of the bladder and prostate was very decided after double castration. Special attention was given to the occurrence of mental and other changes following this procedure. Only one patient presented psychic disturbances, and only five the absence of sexual appetite. In all the others the mental and sexual functions were preserved intact. At the date of the report fifty-four patients were free from tubercle. If one adds to these the seven patients who died of intercurrent disease, but who had recovered from tubercle, we have a percentage of 66·3 *of permanent cures*, a result which is eminently satisfactory.

THE ADMINISTRATION OF ANÆSTHETICS AT BRESLAU.

VON MIKULICZ discusses the indications for the different methods of inducing anæsthesia. The question is not so much as to which agent we shall use, but in what cases should we substitute local for general anæsthesia. He regards Schleich's infiltration method as the only one capable of replacing a general anæsthetic for the larger operations of surgery. Oberst's method is the best for the fingers, toes, and penis. While very pleased so far with the results of spinal cocainisation, he regards it as still on its trial, and in any case as not suitable for the general practitioner, because of the possible complications which may occur during and after the injection.

The author divides operations into the following groups:—(1) Those which should be performed under local anæsthesia, such as the removal of small and especially innocent tumours, tracheotomy, gastrostomy, etc. (2) Those in which a general anæsthetic is necessary, such as the more important operations on the head, the majority of laparotomies, operations on the pelvis, in the removal of the larger malignant tumours, and especially of carcinoma of the breast. (3) Operations in which the method of anæsthesia is a matter of choice, such as some of the operations on the stomach and intestine, the removal of goitres, the operations for simple and for strangulated hernia, etc. In the author's own clinique, during the last five years there have been 2649 operations under Schleich's infiltration method, to 5765 operations under a general anæsthetic. The advantages of local anæsthesia are the avoidance of the direct risk of the narcosis, and the avoidance of the sequelæ which the narcotic agent, especially chloroform, exerts on the heart, liver, and kidneys. (Post-operative pneumonias are as common after a local as after a general anæsthetic.) As general anæsthesia is often compulsory, it should be our aim to render it as safe as possible. The author lays down the following rules:—(1) General anæsthesia should only be had recourse to when necessary. (2) Before resorting to it, any possible contra-indications in the general health or internal organs must be carefully looked for. (3) The narcotising agent must be used with care, and complicated apparatus should be avoided. (4) Ether is on the whole to be preferred to chloroform, but it should not be given to the exclusion of air. The method recently employed in the clinique at Breslau is to inject 0·01 grm. of morphine one hour before, and then administer the ether on a simple Schimmelbusch's mask; in the case of men, and especially alcoholics, it may be necessary to employ an inhaler in order to induce narcosis, but as soon as this is accomplished the inhaler is replaced by the mask. Ether is, of course, contra-indicated in the presence of affections of the air passages. (5) General narcosis is made easier and safer by the preliminary administration of morphine. (6) It is not always necessary to push the anæsthetic to the extent of abolishing the reflexes. In women and children, especially for short operations, a semi-narcosis is quite sufficient. (7) However the narcosis is produced, the respiration and pulse must be observed continuously, and at the first appearance of danger, recourse must be had to artificial respiration without delay.—"Transactions of the German Society of Surgery," Berlin, 1901, Suppl. to *Centralbl. f. Chir.*, Leipzig, July 20, 1901.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Carcinoma of the Pelvic Connective Tissue.

Heinsius (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xlv. Heft 2) refers to the rarity of malignant tumours originating in the pelvic connective tissue, especially that of the broad ligaments. Rosthorn (Veit's "Handbuch") reports twelve cases of sarcoma, but none of primary carcinoma; Herff (Bd. xli.) reported a case, originating in the cellular tissue round the vagina. His patient was 30, two years married, two children—the last, five years before coming under observation—one abortion, followed by febrile symptoms. Patient's chief complaint was pain in left side and back. On examination, a resistance was felt in the left fornix, the size of a hen's egg, separate from the uterus, and regarded as of an inflammatory nature. On account of persistence of the pain, in spite of medical treatment, Küstner performed laparotomy, and found the left appendages normal, with the swelling above referred to in the lower part of the broad ligament. The right ovary, enlarged and cystic, was removed, and the uterus ventrofixed. The swelling in the left broad ligament was still regarded as inflammatory. A month later the pain had increased in severity, and the swelling was larger. Incision through the left fornix gave negative results. A piece of the indurated mass, examined microscopically, showed an alveolar structure, the connective tissue being intermixed with round cells. The swelling was too extensive and fixed to permit of removal. Heinsius, being able to exclude metastasis from any other organ, discusses the probable origin of this malignant tumour from the epithelial elements found in the broad ligaments, namely, accessory suprarenal, parovarium, and Gärtner's duct. From its lateral position, Heinsius believes that the epithelium of Gärtner's duct was most probably the source of origin, tumours reported to have started from the Wolffian body being generally situated in the posterior fornix.

The Cause of Pre-Climacteric Bleeding.

Theilhaber (*Arch. f. Gynaek.*, Berlin, Bd. lxii. Heft 3) does not regard changes in the uterine mucosa, altered conditions of the blood vessels, or abnormal function of the ovaries, as being in the majority of cases the cause of such bleeding. From an examination of several cases, Theilhaber finds no constant typical change, but sometimes fungoid endometritis, sometimes an increase of the connective tissue, and occasionally a perfectly normal mucosa. Changes in the walls of the blood vessels he does not consider of etiological importance, nor does he accept the ovarian endometritis described by Brennecke as yet proved. Theilhaber holds that the important factor in producing climacteric hæmorrhage is an atonic condition of the uterine muscle, produced by proliferation of the connective tissue, whereby the muscular elements are reduced. This view, he thinks, is strengthened by the frequency with which the sound is observed to pass beyond the normal distance in such cases. If the connective tissue proliferation occurs before closure of the blood vessels, this latter will be hindered from deficient muscular development, with consequent hæmorrhage. Theilhaber accounts for menorrhagia in young girls from this atonic condition of the uterine wall.

ABNORMAL MECHANISM IN PLACENTA PRÆVIA.

BLUMREICH (*Arch. f. Gynaek.*, Berlin, Bd. lxii. Heft 3) reports a peculiar mechanism as occurring in a patient, æt. 35, 5-para. Hæmorrhage of a severe type occurred. On examination, the cervix admitted two fingers, and a central placenta prævia was recognised. The placenta was perforated and a foot drawn down. After eleven hours the uterine contractions became almost tetanic, accompanied by very severe pains. In a short time the fœtus, membranes, and placenta were expelled *en masse.* It was found that the membranes were unruptured, the placenta being delivered before the fœtus.

A NEW METHOD OF OPENING AND DRAINING THE BLADDER IN WOMEN.

HOWARD KELLY (*Am. Journ. Obst.*, New York, July 1901) describes a method devised by him for draining the bladder. He regards the ordinary method, by retracting the posterior vaginal wall, fixing the cervix, and then dissecting through the vascular, vaginal, and thick contracted bladder walls, as being slow, awkward, and difficult.

The new method is as follows:—The patient's bladder is emptied, and she is placed in the genu-pectoral position. A catheter is now introduced into the bladder, and through this the air passes in and distends the bladder to a maximum. The posterior vaginal wall is then retracted, exposing the stretched anterior vaginal wall, with the cervix high up. The surgeon then plunges the knife through the vesico-vaginal septum in the middle line, the incision beginning about ½ in. in front of the cervix. The incision can be made any desired length by drawing the knife down towards the urethra. By introducing a finger into the bladder through the incision, the internal orifice of the urethra can be found, and the knife safely guided as far forward as required.

Owing to the position of the patient, the hæmorrhage is very slight. The mucous membrane of the bladder is now drawn through the incision and stitched to that of the vagina. Kelly employs a knife the blade of which is about 1 in. long, and forms with the handle an angle of 110°. The operation does not require a general anæsthetic, the injection of a weak solution of cocaine into the vesico-vaginal septum is sufficient. The posture and above method are also of the greatest use for the removal of calculi and tumours. In such cases the incision may be closed up at once with the greatest ease, the patient remaining in the genu-pectoral position.

PROLAPSUS FUNIS.

SMYLEY (Ingleby Lecture, Birmingham, June 1901) regards this complication of labour as being due in all cases to the lower uterine segment not firmly embracing the presenting part. This occurs in hydramnios, in some pluriparous women; owing to distensibility of the upper portion of the uterus, no lower uterine segment forms; and in others, where present, it is so weak that it is separated from the head by the liquor amnii; also, when the presenting part does not accurately fit the lower uterine segment, or when, owing to pelvic deformities, the head cannot descend into it and close it by its ball valve action. The sudden rush of liquor amnii which often accompanies the complication is not the cause, but arises from the same conditions. In deformed pelves the head may be arrested at the brim, and cannot fill the lower uterine segment; the latter is now forced away from it by the liquor amnii, under pressure from the contracting uterus. Space is in this way supplied for the cord to pass between the head and the lower uterine segment. A consideration of these facts will explain why efforts at reposition so often fail, for so long as the cause remains the result will be the same.

THERAPEUTICS.

UNDER THE CHARGE OF

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THE DIETETIC TREATMENT OF EPILEPSY.

Two years ago a couple of French observers recommended withholding of chlorine from the tissues, as calculated to make them most susceptible to bromine. They employed a diet consisting of 1000 grms. milk, 300 grms. meat, 300 grms. potatoes, 200 grms. flour, two eggs, 50 grms. sugar, 10 grms. coffee, 40 grms. butter, which were not salted during cooking. With such a diet the administration of 30 grs. of potassium bromide had a marked effect, cutting short the attacks within a week. Balint modified this diet slightly, and tried it on thirty cases of old and recent epilepsy. The original French diet proved unpleasant, owing to the difficulty of taking large quantities of unsalted meat. The meat also of itself contains considerable chlorine. Milk diet did not prove any more successful, as it caused severe constipation. Balint then hit upon the plan of baking bread with sodium bromide instead of common salt. His diet sheet then consisted of 1 to 1½ litres milk, 40 to 50 grms. butter, three eggs, 300 to 400 grms. bread and fruit. This diet gives 2300 to 2400 calories, while the chlorides do not amount to more than 2 grms., the maximum amount allowed by the French observers, and at the same time the patient takes 45 grms. of sodium bromide. The results obtained were very striking. At first the patients do not all react similarly. In some cases the attacks cease immediately, in other cases there is either no effect or an initial increase. In from six to seven days in every case an improvement is evident, either by a sudden cessation of the fits, or in a marked diminution in their severity, so that slight twitching may replace the severest form of convulsions. Slight momentary losses of consciousness may represent former convulsive attacks. At a later stage even these slight attacks may entirely disappear. These cases, which, as the journals showed, had for years had two to nine attacks daily, after four to fifteen days' treatment had no further fits, though they had previously been treated with enormous doses of bromides without any effect. This total cessation was got in seven out of nine fresh cases, and in fifteen out of nineteen inveterate cases. In the other 20 per cent. of cases the attacks became weaker and the patients improved mentally, though a total cessation was not obtained. As a rule the treatment lasted thirty to forty days. In one case, where one to six attacks occurred daily, a month's treatment only weakened the intensity and gave free days; on continuing treatment for a further two months, the patient had no further attacks after the middle of the second month. The total average number of fits before treatment was over ten; in the first few days of treatment they rose on one day to twenty-nine, but they fell rapidly, so that from the fourteenth day onwards the fits only amounted to one to three per diem, with days in which there were absolutely none. The mental and bodily health were much improved, and bed-ridden patients were able to go about and do light work, while they increased in weight. There were no ill effects noted. The patients took the diet willingly. As regards permanency of cure, in the great majority of cases the attacks recur on stopping the diet, within a few days, though in a modified form. In one case, where the treatment was continued for three months, the freedom has lasted for one month. It seems, therefore, that the cure should be prolonged as much as possible. It is probable that the treatment is most likely to succeed in a sanatorium. Probably the good of the treatment is due to the organism becoming saturated with bromine, which displaces chlorine. That the improvement is not due to the mere unirritability of the diet, is shown by the fact that the addition of 5 grms. of salt to the diet caused the fits to return in a patient who had been free for fourteen days.—Balint, *Berl. klin. Wchnschr.*, 1900, No. 23.

MODERN TREATMENT OF COUGH.

THE effect of expectoration depends on two points—(1) The expelling power of the air, and the resistance offered by the substance which is to be removed, depending on adhesion and inertia. The expelling speed of the avi varies considerably. In quiet respiration it passes through the glottis at 125 cms. per second, and the pressure supports 2 mm. of mercury. During violent expiration and severe coughing the pressure rises to 150 to 200 mm., and the speed is said to exceed that of the wind in a storm. It is said to be as much as 100 metres per second. Of course during the passage through the bronchi, etc., the speed is much less. These experiments show that there is a great deal of work done in violent coughing, and how exhausting coughing is, especially if it prevents the patient from sleeping. External atmospheric conditions also have an important effect in coughing; with a low barometer the conditions are much more favourable than with a high reading, hence the value of a mountain region with a permanent low pressure. In treating cough, our first endeavour should be to remove any cause, reflex or otherwise. It is not necessary always to stop coughing. In certain cases you aid it by loosening the tenacity of the mucus by expectorants or other treatment. Apomorphine is probably the best drug. Great good can be done by such simple means as keeping the atmosphere moist, and thus preventing the secretion from becoming dried up and tenacious. This can be effected by keeping a kettle boiling, or by some of the various inhalation apparatus. We sometimes modify cough by narcotics, as morphine, which dulls the centre in the medulla; and heroin, which lengthens both inspiration and expiration, thus allowing the moistened air to more effectually penetrate the bronchial tree. Heroin is best given in pills. Dionin, another morphia derivative, seems to resemble morphine very much in action, relieving pain well. The author thinks that belladonna has been too much neglected, as it stimulates the respiratory centre, and paralyses the smooth muscle fibres, and inhibits the secretion of glands. It is chiefly to be used to deprive cough of its cramp-like character, as in whooping-cough. Weiss considers that the combination of expectorants and narcotics is wrong. They should be given separately, the narcotic being given for special indications—as pain, sleep, etc.—Weiss, *Heilkunde*, Wien, 1901.

DRUG TREATMENT OF PARALYSIS AGITANS.

WILLIAMSON has tried many drugs, of which only three have proved of any value, namely, hyoscine hydrobromate, duboisine sulphate, and hyoscyamine. Of these hyoscine is the most valuable. It was introduced by Erb, who gave it hypodermically, and stated that it was much more efficacious thus than when given by the mouth. Williamson objected to the hypodermic use in a chronic disease, owing to the danger of septic infection, risk of overdose, general inconvenience, and pain in the case of women. He tried it by the mouth. At first he employed it in $\frac{1}{250}$-gr. dose, which he subsequently increased to $\frac{1}{100}$ gr. in pill form, without any effect. Subsequently he gives it in mixture with chloroform water. Possibly, owing to the quicker absorption, the effect was much more marked. He uses doses of from $\frac{1}{96}$ to $\frac{1}{75}$ gr. One patient has taken such doses for four years without any ill effects, while the tremor has been much diminished, and the general restlessness and constant desire to change positions has been much improved. If stopped for a few days, the tremor returns, but on again commencing hyoscine the effect is very marked. To remove all symptoms, especially the flushing of the face, large doses of $\frac{1}{64}$ gr. are necessary, but cause dryness of the throat and dilatation of the pupils. The dose should at first be very small, say $\frac{1}{150}$ gr., which can be gradually increased to $\frac{1}{100}$, when, if no toxic symptoms appear, it can be cautiously raised to $\frac{1}{75}$ gr., which is about the usual best dose. Each case must be tried on its own merits, and frequent intermissions should be made. To insure uniformity of results, the same preparation should always be used, as the drug varies. It should always be given well diluted in chloroform water, and is best prescribed twice a day, just after breakfast and again in the evening, to check restlessness and allow sleep. Duboisine sulphate was introduced by Mendel for hypodermic use. Williamson has tried it in a couple of cases, with good results in one case. In one case $\frac{1}{64}$ gr. was the maximum dose, which did not produce toxic symptoms. Its action is similar to that of hyoscine, but is not so powerful. As the one drug is more effectual, the same case should be tried with each. Hyoscyamine sulphate, in doses of $\frac{1}{64}$ gr., gradually increased to $\frac{1}{35}$ gr., has less effect than the other two drugs, but causes less action on the throat. Sleeplessness is often troublesome. For this a little whisky and water may be tried in sulphonal, an hour or two before bedtime. Hyoscine in an extra dose may be given. It is well to remember that in advanced cases the patients are unable to turn readily in bed, hence the bed should not be too soft. For pains in the limbs, antipyrine and phenacetin may be usefully given.—*Med. Chron.*, Manchester, February 1901.

CACODYLIC ACID IN SKIN DISEASES.

SAALFELD was led to try arsenic in this form, owing to the frequency of unpleasant results occurring with the administration of arsenic in Fowler's solution, or in pills. Given by the mouth, arsenic frequently caused gastric disturbance, while Saalfeld has had unpleasant results from the subcutaneous injection of sodium arsenite, owing to the difficulty of resterilising the solution before each injection. Cacodylic acid contains 54 per cent. arsenic = 72 per cent. of arsenious acid. It has been largely used by French observers, who claim that it is a stable, comparatively monotoxic salt, which can be administered subcutaneously in relatively large doses for considerable periods without causing toxic symptoms. Saalfeld has used the sodium salt in fifty cases, and confirms the favourable reports of former observers. He used it in a variety of skin cases—psoriasis, lichen planus, lichen ruber, etc., giving it subcutaneously or by the mouth or rectum. He used pills containing $\frac{1}{2}$ gr. of sodium cacodylate, four pills being given daily. He also used a sterilised 5 per cent. solution, of which 10 to 20 drops ($\frac{1}{2}$ to $\frac{4}{5}$ gr.) were given by the mouth, or 15 minims were injected subcutaneously. The solution can be obtained in sealed tubes. In only one case was there any complaint of gastric disturbance. In about a third of the cases where the drug was given by the mouth, a heavy garlic odour was noted on the breath, and in these cases the fæces had a very repulsive odour. Neither of these conditions were noted after subcutaneous injection. No other unpleasant effects were noted, while two patients who were unable to take arsenic in the form of Fowler's solution or in pills were able to take $\frac{1}{2}$ gr. cacodylic pills four times daily. Saalfeld considers that sodium cacodylate is a useful drug, which is specially suitable for subcutaneous administration, as it can be obtained put up in sterile tubes, suitable for a single injection. It can also be obtained combined with iron, which is a very useful preparation for the treatment of chlorotic individuals.—*Therap. Monatsh.*, Berlin, No. 6, 1901.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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TYPHOID FEVER.

The partial Widal reaction.—Wilson (*Med. News*, N.Y., July 20, 1901, p. 81) gives the results of a study of 1650 blood examinations for the Widal reaction, with special reference to so-called partial reactions. These partial reactions require careful consideration, and are of much practical importance to the observer engaged in carrying out the test for diagnostic purposes, and all additional evidence is deserving of his careful scrutiny. Wilson paid special attention to the following points in his examinations:—(1) Effect on motility; (2) effect on the integrity of the individual organisms; (3) the amount of dirt and detritus in the hanging-drop; (4) the number of bacilli near the edge of the drop; (5) the number, character, and location of the clumps; (6) the dilution. The culture was examined immediately upon being mixed with the suspected blood, and further examinations were made at frequent intervals. The hanging-drop must be of such depth that it will show at least three focal planes. A spot of dirt may adhere to a supposedly clean cover-glass, and attract the bacilli and give a false appearance of clumping. Further, dead and non-motile organisms will fall to the bottom of the drop, and these may assume the character of clumps. He asserts, that if you can find a field in any focal plane of the hanging-drop free from clumps, you can be quite sure that any clumping present is not due to any agglutinating substance, which necessarily will affect organisms in every focal plane. Consequently, in a true Widal reaction, clumps are found uniformly throughout the drop, and the clumps are practically quiescent, there being little movement either of the individual organisms or of the clump as a whole. The edge of the drop is practically free from organisms, showing that the air no longer attracts them, though there may be some increase in the numbers and compactness of the clumps at the bottom of the drop. The individual bacilli in each clump appear to be loosely held together. In a partial reaction, on the other hand, there are many organisms at the edge of the drop. The air exerts the same influence upon the bacilli that it did before the addition of the blood. The clumps may be numerous, but they are different in character, being generally more compact at the centre, with the bacilli at the edge of the clump usually attached at one end only. These clumps often appear to be built up around a piece of detritus present in the drop. All the organisms comprising the clump seem to have retained part at least of their motility, those on the edges being particularly motile, so far as their free ends are concerned. Of the 1650 cases examined, only 265 gave the Widal reaction. This small proportion is explained by most of the cases being only suspicions of typhoid at the time the blood was sent, which was mostly early in the disease. Of the positive cases, forty-six were sent on or before the seventh day of the disease, thirty-six from the eighth to the tenth inclusive, fifty from the eleventh to the fourteenth day inclusive, twenty-eight from the fifteenth to the twenty-first day inclusive, seven from the twenty-second to the twenty-eighth, five from the twenty-ninth to thirty-eighth, and in ninety-three the day was not given. In thirty-four cases the Widal reaction occurred upon the second examination of the blood. Of these, two were negative on the third day and positive on the eighth and tenth days, one negative on fifth and positive on thirteenth, and so on. The reaction was obtained in eight cases that were not diagnosed typhoid, and which gave no history of a previous typhoid injection. Three were malaria: of these, two were soldiers from a typhoid infected camp; and one had had a continued fever two years before. One was a case of diarrhœa, also from a typhoid infected district. One was a case of puerperal fever complicated with phthisis, another of cerebral hæmorrhage, another of chronic endocarditis, and the last of splenic infarction with rupture. The possibility for error in diagnosis in all such cases is great. Of the 1115 negative cases, 117 proved to be typhoid, but the blood was only sent to the laboratory one time, and mostly at an early date. Thus 35 per cent. were sent before the end of the seventh day of the disease, 38 per cent. after the seventh day and before the end of the fifteenth day of the disease, and 27 per cent. after the fifteenth day of the disease, all but three of these being sent during the third week of illness. Of the positive cases, 33 per cent. occurred in the first week, 84 per cent. before the end of the second week, 16 per cent. in the third week, and 4 per cent. in the fourth week. The test is thus of great advantage as a rapid and early means of diagnosis. Where the reaction occurred, upon the second examination of the blood, 56 per cent. were found before the end of the second week. This would probably have been longer had the second sample of blood been sent more promptly. Clinicians are apt to look only to their own immediate interest in these examinations, and the larger question of accurate scientific knowledge suffers. Less than 7 per cent. of the partial reactions were found in typhoid infections, and they occurred more frequently in both tuberculosis and malaria than they did in typhoid. They were found in thirteen different conditions, and probably many different febrile diseases will be found to give the partial reaction. The value of the *partial reaction* to the clinician is therefore absolutely *nil.* It is only an indication to send another sample of blood, as it does occur in a few typhoid cases. In the bloods where the Widal reaction occurred on the second examination, there were only two where the partial reaction was present on the first examination, and there is no reason to believe that this partial reaction would not have been present had the patient been suffering from several other febrile diseases, instead of a typhoid infection.

The complete reaction.—Tobiesen (*Ztschr. f. klin. Med.*, Berlin, Bd. xliii. Hefte 1 and 2) gives the results of the application of the test during the last three years, using different dilutions, from 1 in 10 to 1 in 200. Most observers are agreed that a positive reaction is to be relied on, only if it occurs in a dilution of 1 in 50. Of 350 clinically undoubted cases of typhoid, the reaction was positive in 329 with 1 in 50; seventeen gave the reaction only with 1 in 10, or 1 in 25; while in two a weak reaction could only be obtained with a dilution of 1 to 5; and in two no agglutination was present during any period of the disease. One hundred and fifty-one cases suffering from other diseases (*e.g.* tuberculosis, lobar pneumonia, influenza, scarlet fever, rheumatism, etc.) were also examined, with the following results:—Positive in 4 in dilutions 1 to 25, in 25 in dilutions 1 to 10, and negative in 122 in dilutions 1 to 10. Sixty-one healthy persons who had never gone through a typhoid were also examined. One gave a positive reaction 1 to 25, 8 positive 1 to 10, and 52 negative 1 to 10. The time limit was two hours, which is now considered rather long. Of 290 cases examined, 138 occurred in first week, 111 in second, 30 in third, and 11 in fourth. Rarely is a reaction obtained only during the relapse, and there is no definite relation between absence and presence of reaction on the one hand, and probability of relapse on the other, nor between strength of agglutination and severity of disease, which makes the reaction valueless from a prognostic point of view. With convalescence, the agglutinating power of the blood rapidly diminishes.

THE BLOOD.

The red blood corpuscles as bactericides.—Heim (*München. med. Wchnschr.*, April 30, 1901) publishes some observations, which throw doubt upon the generally received view that the leucocytes alone among the blood corpuscles have bactericidal properties, and maintains that the red cells should not be rigidly excluded. Typhoid bacilli in pure bouillon cultures were added to fresh defibrinated blood, and the mixture allowed to stand at body temperature. The blood cells first become pale and biscuit-shaped, or take the thorn-apple form; later on they disappear entirely. The bacteria lose the power of motility and become aggregated in clumps, which are not so typical as in true agglutination, and ultimately, in about four days, become swollen and granular. This destruction of bacilli differs from the ordinary bactericidal action of the serum in the time of its occurrence. In the latter case the action is rapid, appearing during the first twenty-four hours, whereas in the former case it is slower, the breaking down of the red cells first acting as a favourable nutritive medium for the bactericidal growth, while later the invading bacteria become subjected to degenerative processes.

Neutral red as a stain for nucleated red blood cells.—Bettmann (*München. med. Wchnschr.*, June 11, 1901) recommends the following method for the rapid recognition of nucleated red cells. A small platelet of elder-pith is saturated with a concentrated aqueous solution of neutral red, a small drop of blood is then placed over it, and the platelet examined in the hanging-drop. The red blood cells stain a brownish red, and their nuclei a deep brown colour; the nuclei are seen to first diminish in size after becoming star-shaped, and small granules separate and lie free in the protoplasm. The nuclei became decolorised after several hours, but can be restained by adding fresh neutral red.

LEUCOCYTES IN GASTRO-ENTERIC DISEASES IN INFANCY.

JAPHAR (*Jahrb. f. Kinderh.*, Leipzig, 1901, Bd. iii. S. 179) gives the normal leucocyte count in infants under ten months as 13,500, and states that there is much individual variation. Mononuclear cells predominate, the average number of polynuclear cells being 42 per cent. In dyspepsia, infantile atrophy, and gastro-enteritis, there is no change in the proportions of the various kinds of leucocytes. In follicular enteritis and cholera infantum, with marked intestinal lesions, there is an absolute increase in the total leucocytes, and a small relative increase in polynuclear cells. He maintains, then, that the lymphocytosis described in intestinal diseases in infancy does not exist.

EOSINOPHILIA IN TRICHINOSIS.

ROSENBERGER (*Path. Soc. New York*, June 27, 1901) read a report of the pathological findings in a case of trichinosis in St. Joseph's Hospital, under the care of Dr. Da Costa. Four blood counts showed eosinophiles, varying from 2·5 to 4 per cent. Eosinophilia is commonly met with in initial outbreaks of trichinosis, but is also met with in a good many other diseases, and it may not be present in some cases of trichinosis, especially in recrudescences of the lesions; hence it is not pathognomonic of the disease.

THE EXCITING CAUSES OF INFANTILE PARALYSIS.

ZAPPERT (*Jahrb. f. Kinderh.*, Leipzig, 1901, Bd. iii. S. 125) gives the results of a study of 208 cases of poliomyelitis, observed over a space of twelve years in the polyclinic of Vienna. The view that it is of an infectious origin is now generally held. There is a preponderance of cases in the summer months. In five cases the palsy was said to be of congenital origin, but in only one of these was the evidence satisfactory. This could be explained by the existence of a hæmorrhage at the level of the anterior horns, produced during birth; or one might admit the existence of a progressive muscular atrophy of the Werding-Hoffmann type. Traumatism was the imputed cause in five cases, but in two only was it admissible. The influence of cold, violent impressions, muscular fatigue, and heredity has never been satisfactorily established. Of thirty cases in which the previous occurrence of an infectious disease was mentioned, in five infantile paralysis followed after a brief interval or even directly. Of these, measles was mentioned twice, scarlatina once, and diphtheria twice. The infections must act either by increasing the violence of the specific agent, which is yet unknown, or the disease may be caused by various morbid agents or their toxines. It is possible that the infectious disease may act by producing an ascending neuritis, which produces a lesion of the cord, of which the infantile paralysis is the clinical expression. If the view that infantile paralysis is an infectious disease be true, its power of contagion is very limited.

THE CAUSAL ELEMENT OF VACCINIA AND VARIOLA.

FUNCK (*Deutsche med. Wchnschr.*, Leipzig, 1901, Bd. xxvii. S. 130), in a preliminary report of studies carried out in the Servo-therapeutic Institute of the University of Brussels, states—(1) Vaccinia is not a bacterial disease. (2) Vaccinia is a protozoal infection; the organism can easily be seen in vaccinal pustules and in active lymph. (3) The inoculation of these parasites in a sterile emulsion causes vaccinia in all animals. (4) The inoculation of this emulsion confers immunity against further inoculation of vaccine. (5) The pustules of variola contain a protozoon, which is similar, morphologically, to that of vaccinia. (6) As a result of these experiments, it is shown that variola and vaccinia are two identical affections, that vaccinia is a milder form of variola, and hence the anti-variolic immunity, which is produced by vaccination, comes under the general laws of specific immunity. The fact that lymphs preserved in glycerin preserve their characteristic activity, shows that the activity is due to some organism other than a bacterium, since they remain absolutely sterile in all ordinary culture media. In fresh lymph, characteristic elements are to be found, doubtless identical with those originally described by L. Pfeiffer, and clearly corresponding to large egg-shaped, non-staining vacuoles, which are seen in dried specimens. There are to be found—(1) Refracting, structures from 2 to 10 μ in size, which show slow but characteristic movements at 37° C. (2) Egg-shaped cells, which, more or less elongated, show a laterally placed nucleus, and in the protoplasm fairly rounded clumps of glistening spheres, similar to these, and from 1 to 3 μ in diameter. (3) Most abundantly of all, in all lymphs, larger structures, often rounded, and 25 μ in diameter, with or without double contour, sometimes egg-shaped, and 30 to 35 μ in length by 20 to 25 μ in breadth. He thinks these are cysts (sporoblasts) full of spores, in which the nucleus appears as a large clear spot. They lie in lines in the pustules, being often as many as twenty to forty crowded together. The egg- or pear-shaped forms occurring in linear masses are most frequent in old lymphs, while single motile forms are most common in fresh lymphs. Funck suggests the name of *Sporidium vaccinale* for the organism. In a hanging-drop the protozoon is seen close to the cover-glass, while the leucocytes fall to the lower part of the drop. He has been able to separate the protozoa by means of a fine spatula made of platinum wire, under low powers of the microscope, and after washing them twenty to thirty times in a drop of bouillon, has inoculated them into calves and produced typical pustules on the sixth day, the animal also acquiring a typical immunity. Similar structures are found in the pustules of the variola. These inoculation experiments are particularly interesting, and, if verified by other observers, will become of great importance. Further reports and developments will be awaited with interest. Meanwhile these results may be compared with those of Calmette and Guerin on experimental vaccinia, which were referred to in the Abstract of Pathology of July last. They found that microscopic examination of lymph, obtained with every possible precaution on the fourth day, showed very few bacteria stainable by ordinary methods, but many very minute refractile motile granules. In glycerinised vaccinal pulp these granules are larger and immobile, and the better the quality of the vaccine the more numerous they are. A skilled observer may indeed affirm with certainty, that the vaccine will be good or bad according to the number of these refractile free granules, which the authors suspect to be the infectious agents of vaccinia.

PHYSIOLOGY.

UNDER THE CHARGE OF

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NITROGEN EQUILIBRIUM.

OUR knowledge of the proteid requirements of the human organism has been mainly derived from the work of the Munich school, led by Carl Voit, who in 1875 published the normal dietary for the average working man (118 grms. proteid, 56 grms. fat, and 500 grms. carbohydrate). Although many workers have objected to this as a representative diet, still, even at the present day, it remains as the typical standard in most publications. Professor Tigerstedt has recently reopened the subject, by instituting researches on the proteid minimum required to keep the organism in a condition of nitrogen equilibrium, and Sivén, working under his direction, has recently published two researches which have attracted a good deal of attention ("Ueber das Stickstoffgleichgewicht beim erwachsenen Menschen," *Skandin. Arch. f. Physiol.*, Leipzig, Bd. x. S. 91, and Bd. xi. S. 308). His results, derived from an investigation carried out on himself, are so different from those of Voit in many respects, although still more in opposition to those of Pflüger, that they merit the attention of all interested in the subject of dietetics. The cardinal point of the whole question is, What is the minimum of proteid required by the normal human being, which will allow him to carry out his work in the most satisfactory manner? That there must be a variety of proteid minima, requisite for different individuals, will be granted by all; but this only emphasises the necessity for stating in detail, not only the food material employed, but also the conditions under which it was given.

Older investigators (Lehmann, Frerichs, Bidder, and Schmidt) held the view that this proteid minimum just equalled the proteid waste in hunger, and that that quantity of proteid over and above this in the diet was really a *luxusconsumtion*. Voit emphatically denies this, holding that no matter how great the quantity of nitrogen-free material added to the amount of proteid, equivalent to that used up in hunger, the organism could not maintain itself without a continual proteid waste; and that, in order to keep the body from gradually losing nitrogen, it was necessary in man, as well as in the dog, to give two and a half to three times the amount of proteid used up in hunger. In investigating the subject of the proteid minimum requirements, it is necessary to know exactly, not only the amount of nitrogen excreted in the urine, as also the amount taken in day by day, and the amount of the latter unabsorbed and excreted by the fæces, but, in addition, one must see that the food taken is of the necessary caloric value to allow of the ordinary amount of work being carried out.

Hirschfeld (*Arch. f. d. ges. Physiol.*, Bonn, Bd. xli. S. 533) was the first to investigate the matter scientifically, but even his results, owing to the marked variations in his diet, must be received with caution. Still, he was able to show that a man could, for a short period at least, subsist on a nitrogen intake of 7·44 grms. without suffering tissue waste. Klemperer came to the same results, but also only over a short series of analyses. Others, especially Peschel, have investigated the matter, and have come to the conclusion that Voit's standard is too high, but in every case there is a doubt as to whether the true minimum has been reached. Voit emphasised very strongly the necessity for a comparatively large amount of proteid, proportionate to the requirements of the organism; that is to say, a larger amount for a muscularly strong man than for one whose build is feebler.

Sivén started with the idea of gradually lowering the amount of proteid in his dietary without lowering (or raising) the caloric intake, until the lowest limit of nitrogen equilibrium was reached, when the least further removal of proteid from the food resulted in the tissues losing their proteid. In all previous investigations, as the nitrogen intake was lowered that of nitrogen free substances was greatly increased, and one was led to believe that, if this excess were not given, the proteid minimum would be a higher one. As will be seen, the results arrived at were absolutely different from those expected. The daily caloric intake was almost constant, being 42·6 calories with alcohol, or 39·7 without alcohol, per kilo body weight. The work was arranged in six series. In the first 12·69, in the second 10·35, in the third 8·71, in the fourth 6·26, in the fifth 4·25, and in the last, 2·4 grms. of nitrogen were taken, while the amount of fat remained fairly constant at about 115 grms., and the carbohydrate rose gradually from 243·6 grms. in the first to 290 grms. in the fifth series. The sixth series is not of so much value, for reasons which cannot be entered into here. The results arrived at were of great interest. Until the close of series 5, nitrogen equilibrium was established; while in series 6, nitrogen was constantly being lost from the organism. This gradual waste, noticed in the last series, may have been due to the fact that the caloric intake was not well distributed throughout the day, and perhaps also from the fact that a larger amount of alcohol was taken, leading to an increased proteid consumption, or that the food was not so well absorbed. Thus Sivén was able, with 0·48 grm. proteid per kilo body weight, to keep himself in nitrogen equilibrium even while doing a good day's work, and when his caloric intake was only 41·4 per kilo. Thus Sivén's minimum is lower than the hunger minima nitrogenous waste (cf. the results obtained for Cetti, Breithaupt, and Succi). The hunger minimum of the last mentioned (*i.e.* the proteid waste) on the twenty-first to twenty-fifth day of starvation was nearest that of Sivén, 0·09 grm. nitrogen being excreted per kilo body weight. One must remember, also, that Succi's nitrogen must have been practically solely derived from proteid, while Sivén's was not. Thus Voit's dictum, according to Sivén, is not correct when he affirms that the proteid minimum sufficient to keep the body in nitrogen equilibrium always stands higher than the amount of proteid waste in hunger. Sivén comes to the conclusion that without an increase in the normal caloric intake, the nitrogen intake, in the form of pure proteid, may be lowered to 12·5 grms. daily, or 0·02 grm. proteid nitrogen per kilo body weight without disturbing nitrogen equilibrium. It is, however, extremely unlikely that a person could subsist on such a dietary as Sivén was on for anything but a very short period.

The author opposes the view of Voit, that a muscularly strong individual can only be accommodated for a smaller intake of nitrogen than Voit's normal standard, by losing some of his own proteid, and so becoming an individual whose needs, in virtue of the loss of muscle, are no longer so great, and who can thus be kept in nitrogen equilibrium on a lower nitrogenous supply. Sivén shows that any loss of weight in his case did not result from a proteid waste, but probably from loss of water or fat.

The author next investigated the rôle which non-albuminous nitrogenous substances, such as asparagin, play in metabolism. He, in his first paper, comes to the conclusion that it is possible, if not probable, that such bodies are not always so directly excreted from the organism as is generally believed, but that they may be synthetised to proteid. However, in his later paper, he returns to the view held by the majority of workers on this subject, that these substances are not synthetised to proteid in the animal organism.

All Sivén's work goes against Pflüger's view, that the proteids are the main source of muscular energy. In order to determine the amount of work done by him in the day, and the possible sources of the energy required for carrying out the work, he counted the number of strides taken by him during the day. Taking Sondén and Tigerstedt's works as his standard for the increase in CO_2 excretion during muscular work, the author calculates that the decomposed proteid could only have furnished about one-third of the CO_2 given off during the day, and hence the muscular work must have been carried out mainly at the expense of nitrogen-free substances. An important point brought out in the second paper is that the organism, after a heavy loss of proteid, strives, when the proteid in the diet has been increased, to arrive at a state of nitrogen equilibrium again, but is able only very slowly to retain nitrogenous material, showing that organised material is only slowly formed from dead proteid. There are many other points of interest in this paper which will repay a reader for any trouble entailed in the perusal of it.

FORMATION OF LACTIC ACID IN THE BLOOD.

THE results of an important investigation by Asher and Jackson (*Ztschr. f. Biol.*, München, Bd. xli. S. 393) may be shortly summarised as follows:—(1) On artificial transfusion, the decomposition of organic substances is different in type from that occurring under conditions nearly allied to the normal. (2) There is no proof of the origin of lactic acid from dextrose in the organism. (3) The formation of lactic acid has intimate relationship to proteid decomposition in the tissues. (4) Deficient oxidation of carbohydrates, from want of oxygen, cannot be regarded as a cause of lactic acid formation. (5) The further transformation of lactic acid in the organism probably takes place in many tissues. Even in birds it is by no means proved that the formation of uric acid from ammonium lactate takes place in the liver alone.

DISEASES OF THE EYE.

UNDER THE CHARGE OF

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Cataract Extraction in India.

The special "Cataract" number of the *Indian Medical Gazette* forms very interesting reading, if it were only as showing two things, the extraordinary number of patients undergoing operation, and the fact that good results may be obtained by surgeons whose methods are, as one might say, diametrically opposed. The numbers are such as would, in the now classical phrase, "stagger humanity," or at least European humanity; for example, Smith of Jullunder, Punjab, gives statistics of his results in nearly 2000 cases, these representing less than a year's work. He tells us that during a recent month of thirty-one days he operated on 688 cataracts, and during that time on *each* of two particular days he operated upon forty-four patients. The papers are all exceedingly practical, and well worth study by any one whose work lies in that direction. One cannot fail to be struck with the much more free use of antiseptic solutions of greater concentration than are ever, we should imagine, used here. As one of the writers says, it may or may not be all very well to aim at asepsis at home, but in the vastly different conditions of Indian life and Indian patients, nothing short of antisepsis can ever be worthy of dependence. In the actual operation, in the use of eserine or atropine, or neither, in the position of the wound, in the performance of an iridectomy or not, there are marked divergences of habit and predilection, as one would indeed expect. There are differences in the recuperative powers in the patients, recruited from different tribes and districts; the fact that numbers are illiterate makes it difficult to record vision with exactitude; the inability of so many to return probably causes unripe cataract to be attacked much more often than at home, and a form of operation to be favoured, which by one means or another avoids necessity for a subsequent needling. It is no doubt this last consideration which has weighed to some extent with one surgeon of immense experience, in inducing him to adopt, as his customary method, extraction in the capsule, an operation rarely performed in this country in uncomplicated cases.—*Indian Med. Gaz.*, Calcutta, June 1901.

Ulcus Rodens Corneæ.

This peculiar and somewhat rare condition of the cornea, to which a reference will also be found in our issue of June 1900, has lately been the topic of two interesting papers. In both of these the singular mode in which this form of ulcer progresses is again insisted upon,—its habit, namely, of healing at one part while it spreads under an overhanging margin at another. This undermined margin is the principal characteristic of the disease, and it is one which not only makes it easy to deceive one's self as to the true extent of the ulcer, but also greatly complicates the treatment, and is apt to render it less efficient. As Schmidt-Rimpler remarks, the organisms interested in the spread of the ulcer are kept under shelter, so to speak, by this overhanging margin, and any application, to be effective, must be introduced into their hiding-place. Andrade has had success from the subconjunctival injection of corrosive sublimate, though other observers have not been so successful with this method of treatment. Fuchs, again, is confident of the efficiency of the cautery; Schmidt-Rimpler has found it valuable also, when its use was preceded by scraping, but he thinks Fuchs distinctly too optimistic in regard to a disease so persistent as this; Andrade in one case obtained a good result fairly quickly by scraping the ulcer so as to freshen its surface, over which he then drew a bridge of conjunctiva, thus insuring rapidity of healing. Andrade found a hitherto undescribed organism in the granulation tissue about the margin of the ulcer; it was in rods about the size of *Bacterium coli*, often joined two and two like Morax's bacillus, and was very mobile; this, he thinks, may be the causative agent.—*Arch. Ophth.*, N.Y., March 1901; *Ann. di ottal.*, Pavia, 1901, tome xxix. part 6.

EMPHYSEMA ABOUT THE EYE.

It is probably nearly as frequently by the general as by the ophthalmic surgeon that emphysema round the eye is first seen. It is most frequent in the lids, next among the orbital tissues, then under the conjunctiva, in which last position it is very rare. For the occurrence of emphysema it is obvious that three conditions are essential, namely, a communication between the air passages and the cellular tissue, the forcing of air through this aperture, and the absence of any external wound by which the air might escape. Naturally, it is usually immediately after the injury that the blowing up of the tissues takes place, for the patient is apt to feel a little uneasiness about the nose, perhaps a trickle of blood, to get rid of which he uses his handkerchief, thereby at once inflating the cellular tissue. But this need not occur at once, for cases are known in which between the receipt of the original injury and the occurrence of the emphysema thirty-six hours, three days, and even twenty-four years had elapsed. The bony structure of the roof and floor of the orbit is too strong to give way under any ordinary impact, but the inner wall, especially that part of it formed by the lamina papyracea, or os planum of the ethmoid, is very fragile, and will yield almost to a touch of the finger. Were the injury due to contre-coup, however, as is generally stated, the fracture ought rather to be at the base of the skull, for it is in that direction that the force of the impact would be carried. Fuchs therefore considers it much more probable that it is the globe itself which, driven forcibly against the os planum, causes the slight plate to give way. A curious corroboration of this theory is that, according to his experience, emphysema of this region never coexists with rupture of the globe, though the same sort of injury is apt to produce each of these lesions. If the coats of the eye give way, there is not the same impact against the orbital wall, and no fracture occurs, and therefore no emphysema. Several instances are on record of persons producing emphysema of the lids by violent nose-blowing, without any previous injury whatever; this was attributed by Desmarres to rupture of the lachrymal sac, but Fuchs is of opinion that a fissure of the ethmoid from bone disease must have existed previously, and that it is extremely doubtful whether air can be driven into the sac from the nose. Schanz has recorded a very curious case, in which a glass-blower was able, when blowing strongly with his cheeks, to dilate Steno's ducts and inflate his parotids with air. One morning, when doing this, he felt violent pain in the right eye, which at the same time became "blown out" beyond the lids by emphysema. A diverticulum of the lining membrane of the air cavities has also been known to protrude into the orbital cavity, which could be distended by the patient when singing, sneezing, etc.; this caused protrusion of the globe, but not emphysema in the proper sense of the word.—*Wien. klin. Wchnschr.*, 1901, Bd. iv.

UNILATERAL REFLEX IRIDOPLEGIA.

UNILATERAL reflex iridoplegia, the Argyll Robertson sign on one side only, is occasionally seen, but very rarely, and its existence complicates considerably the question of the situation of the lesion causing the ordinary form. The two sphincter nuclei are doubly connected, for there is not merely an incomplete crossing of the pupillary fibres, but there is also a directly connecting band. This obviously excludes the possibility of its being due to a lesion of the centripetal reflex fibres, as was at one time believed, for a stimulus applied to one eye would necessarily be conveyed to both eyes, and contraction of both pupils occur. Another suggested explanation was that the sphincter fibres might have a double origin, from the sphincter nucleus proper and from the accommodation nucleus, each of these having influence only in its particular function. But in such a condition, if unilateral paralysis occurred, the immobile pupil would necessarily be larger than the other, which is not the case. Levinsohn suggests that there may be two sets of cells in the nucleus, one of which is engaged in the light reflex, while the other has the function of causing or permitting the transformation of other stimuli into contraction of the pupil. This theory is very much like the other, but in the case of a contracted immobile pupil we do not require, as in the first, to postulate an irritation of the accommodation nucleus, a proposition for which there is no foundation. If, then, a lesion exists at the point of departure of the centrifugal reflex tract, it will be capable of producing a unilateral reflex iridoplegia with a contracted or imperfectly acting pupil.—Levinsohn (Berlin), *Arch. Ophth. N.Y.*, March 1901.

AMBLYOPIA CAUSED BY SALICYLATE OF SODA.

AT a recent meeting of the Ophthalmological Society, Snell (Sheffield) related a case in which blindness appeared to be occasioned by the internal administration of salicylate of soda. The patient was a girl of 9, who was suffering from acute articular rheumatism. Salicylate of soda was administered in 5 gr. doses every three hours, until the morning of the third day, when she woke up after a very restless and disturbed night, saying that all was quite dark. It was quite certain a few hours later that she could not tell light from dark, but it was not till the following day that she was seen by Snell, who found the pupils dilated but still active to light, the media clear, and no changes in the fundus, though there was no perception of light. The sensation of the cornea was not interfered with, and neither deafness nor tinnitus was complained of. She died the following day, by which time no changes had appeared in the fundus; no autopsy could be obtained. It is evident that the proof here is not quite complete, but it certainly seems probable that the drug was the cause of the amaurosis. One or two such cases have been recorded already.—*Ophth. Soc.*, July 1901.

OPHTHALMIA NEONATORUM.

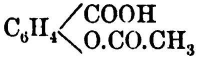
EVERY surgeon who has had any experience of ophthalmia neonatorum will be ready to admit that the behaviour of various cases forces upon his mind the belief that there must be essential differences in the nature of the inflammation in one case from another. Groenouw (Breslau) confirms this view, already held on clinical and other grounds by all, from a bacteriological examination of one hundred consecutive cases which he has studied. From these cultivation experiments it is plain that any of a number of organisms may be responsible for such an occurrence,—in particular, the *Gonococcus, Pneumococcus, Streptococcus pyogenes, Bacterium coli,* and perhaps *Staphylococcus aureus.* A point of considerable importance is, that while it is quite true that the severe cases are in the majority of cases caused by the gonococcus, some violent attacks are present without any sign of that organism; and, on the other hand, in the cultures taken from some quite mild catarrhs the gonococcus is plainly in evidence. Corneal ulcers, however, he only found in cases in which the gonococcus was present, whether the conjunctivitis was severe or mild. Further, since gonococci may be found in the discharge for days or even weeks after pus has ceased to form, one ought to see to it that the silver preparation (or other antiseptic) is continued for some considerable time after purulent secretion has stopped,—a point not always sufficiently attended to. In a very considerable proportion of the cases, especially the milder types, he found no pathogenic organisms whatever.—*Arch. Ophth.*, Leipzig, Bd. lii. S. 1.

ANALYTICAL REPORTS.

ASPIRIN.

(Farbenfabriken vorm. Friedr. Bayer & Co., Elberfeld.)

NEATLY dispensed in twenty 1 grm. (15 grs.) powder packets, samples of the Acetic Ester of Salicylic Acid, in common pharmacol parlance, Aspirin, have reached us. Like salol, Aspirin is but slightly affected by dilute mineral acids, and thus passes almost unchanged through the stomach into the bowel; unlike salol, it contains no carbolic acid, and appears to exert no antiseptic action in the bowel. Its formation reads—



$$C_6H_4\langle\begin{matrix}COOH\\O.CO.CH_3\end{matrix}$$

Aspirin forms small white crystalline needles, melting at 130° C., and only soluble in water to the extent of 1 per cent. at 37° C. Easily dissolved in alcohol and ether, readily in dilute solutions of alkalies —quickly splitting up in the latter into its components—it is but sparingly soluble in acids, nor do these cause decomposition. In taste it is slightly acid. Perchloride of iron gives no blue colour, *i.e.* no free salicylic acid. It is much more slowly absorbed than the salicylates, and more slowly eliminated. By virtue of the former property it is credited with lack of ability to cause ringing in the ears, because this phenomenon proceeds from "sudden flooding of the system with salicylic acid"; and of the latter property with a more lasting action. Here we venture to dissent. Tinnitus aurium, due to administration of salicylic compounds, need not depend upon too rapid absorption of the acid; far more is it a sign that the body contains more of the salicylic compounds than it can tolerate, because elimination lags behind absorption, even of small though repeated doses. That Aspirin is got rid of more slowly, and at the same time is not liable to cause ringing in the ears, is a possible proof, either that it is not all absorbed from the bowel, or that that part which is absorbed is not all in an active form. Tinnitus aurium is far from being a disadvantage; for it is regarded by many as a valuable indication that the salicylates are doing their duty, and the system properly has come under their influence, by what time smaller doses may be exhibited, and the saturation of the body with the drug maintained, but at a slightly lower level. To the credit side may be placed its palatability, lack of rousing gastric disturbance, and of depressing the action of the heart.

Most of these recondite salicylic compounds, devoid of the chief disadvantages attendant upon the administration of natural salicin and salicylates, and still more of the prepared salicylic acid salts, lose as much in therapeutic efficacy as they gain in pleasantness, or can boast of in attributes theoretically most superior.

Still, a number of authorities have testified to the value of Aspirin in rheumatic disorders of all varieties, in doses of 15 grs., and from 15 to 96 grs. daily. The chief recommendation, in their view, seems to be the absence of digestive disturbances and of sweating (the latter, *nota bene*, in cases of acute rheumatism), and their verdict to be that, if sodium salicylate happens not to be tolerated, Aspirin affords a most promising substitute. It may advantageously be given with about four times its bulk of sugar in half an ounce of water.

OBITUARY.

William Husband, M.D., F.R.C.S.Ed.

To many generations of Edinburgh men, the news of Dr. **Husband's** death will bring a feeling of sad regret; for some it means the removal of the last living link with their old school.

William Husband took his degree in 1846, and after some further studies settled down in Edinburgh. He devoted himself with zeal to the diseases of women and children, and gave particular attention to the practice of vaccination. For many years he was the teacher of this subject at the Royal Public Dispensary. He introduced the method of preserving vaccine lymph in capillary tubes—a method which has in other fields borne rich fruit.

Dr. Husband was a man of kindly nature and cultured tastes. Quiet and retiring by nature, he was less known than he deserved to be, but, by those who had the privilege of his friendship, he was recognised as a man of great attainments, absolute integrity, and generous character.

For some time his health has been failing, and during the early days of August he became seriously ill. It was hoped he might recover, but his strength failed, and he passed quietly away on the 20th August.

James W. Miller, M.D.

The death of Dr. **Miller** of Dundee is much regretted, not only in the counties of Forfar and Fife, but over a wide area of Scotland.

After graduating at Edinburgh in 1857, James Miller settled in Dundee forty-four years ago. He had a long, hard, uphill fight in his early days, but this strenuous struggle only served to bring out the native worth of the man and to strengthen a character which was by nature of a high type. For many years he was the foremost member of the Staff of the Royal Infirmary, and to him the institution owes much of its present prosperity. He became a member of its Board of Managers, and in this capacity he was of signal service to the hospital. In public affairs he took great interest. He was on the Council of University College, and on the Board of the Victoria Hospital, and may justly be regarded as one of those who, by their labours, have developed the Dundee School as a teaching centre.

Dr. Miller made several contributions of real value to medical literature, and was perhaps even more useful to modern Medicine by his stimulating influence upon younger men. In character he was one of the most fearless and loyal of men, hating insincerity and humbug, yet tender as a woman withal. His death has left a deep sense of personal loss with a wide circle of friends.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Means for the East of Scotland District, for the Five Weeks ending July 27, 1901; and for the Year from January 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	56°·5	[1] 402°	0°	2·6	16·2	146	847	2°·2
		[2] 1282°	612°					
Observed	60°·5	[1] 518°	0°	1·7	14·6	158	592	1°·7
		[2] 1346°	657°					
Difference	+4°·0	[1] +116°	±0°	−0·9	−1·6	+12	+105	−0°·5
		[2] + 64°	+45°					

Vital Statistics.

Mortality in Four Large Towns in the East of Scotland (Edinburgh, Dundee, Aberdeen, and Leith), during July, and since January 1, 1901. Actual Numbers and Rate per 10,000 per annum.

		Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1]	1018	171·8	229	38·8	103	17·3	134	22·7	121	20·5
	[2]	8256	198·9	1663	40·6	790	19·0	1626	39·0	943	21·3
Actual Deaths and Rate per 10,000	[1]	1100	185·5	251	42·3	116	19·5	132	22·3	132	22·3
	[2]	8290	199·7	1727	41·8	829	19·9	1427	34·3	933	21·1
Difference from Mean	[1]	+ 82	+13·7	+22	+3·5	+13	+2·2	− 2	−0·4	+11	+1·8
	[2]	+ 34	+0·8	+64	+1·2	+39	+0·9	−199	−4·7	−10	−0·2

		Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1]	76	12·9	31	5·2	63	10·6	111	18·8	49	8·4
	[2]	510	12·1	214	5·1	646	15·6	845	20·2	360	8·5
Actual Deaths and Rate per 10,000	[1]	90	15·1	34	5·7	74	12·4	95	16·0	73	12·3
	[2]	568	13·5	246	5·8	663	16·0	751	18·0	435	10·4
Difference from Mean	[1]	+14	+2·2	+ 3	+0·5	+11	+1·8	−16	−2·8	+24	+3·9
	[2]	+57	+1·4	+32	+0·7	+17	+0·4	−94	−2·2	+75	+1·9

* Note.—The figures[1] denotes the data for July,[2] for year to date.

The four weeks ending July 27, 1901, were chiefly remarkable for the high mean temperature experienced during them; a mean temperature 4° above the normal, constituting a record for the East of Scotland district since regular observations were begun. The third week gave an excess of 6° over the average. The highest temperature recorded was 85°, the lowest 41°. The accumulated day-degrees over 40° F. for this period show an increase of 28·6 per cent. above the usual sum, 518° in place of 402°. The rainfall was 34·6 per cent. below, the hours of sunshine 12·4 per cent. above the average.

The values for the year to date, at length yield an excess of warmth, the deficit of −52° at the end of June becoming +64°, and topping the excess of cold degrees by 19°. The amount of rain is considerably less, the hours of bright sunshine much more than expected.

With this hot, dry, and sunny weather, however, the number of deaths are increased; constitutional, digestive, circulatory, nervous, cancerous, and even pneumonic causes contributing to this. The cancer increase reaches as much as 49 per cent. over the mean.

The year to date is chiefly noticeable for the great increase in deaths from cancer.

EDINBURGH MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

PRIMARY CARCINOMA OF THE DUODENUM.

By W. Soltau Fenwick, M.D. (Lond.), M.R.C.P., *Senior Physician to the London Temperance Hospital and Physician to the Evelina Hospital for Sick Children.*

Carcinoma affects the duodenum as a primary disease much less frequently than the stomach. In the course of 42,000 post-mortem examinations made in Vienna, a primary malignant growth was found in the intestines in 443 cases, but in only seven, or 0·017 per cent., was the duodenum the seat of the disease (Schlesinger). According to Perry and Shaw, ten examples of the complaint occurred in 18,000 necropsies performed at Guy's Hospital (0·05 per cent.), but of these only four are stated to have been carcinomatous, while among 19,518 post-mortems recorded at the London Hospital I find that the duodenum was the seat of a cancerous growth in eighteen, or in about 0·09 per cent. If allowance be made for the occasional inclusion of sarcomata in the latter statistics, it would appear that primary carcinoma of the duodenum is met with once in about 1500 to 2000 necropsies in London, and thus presents a ratio to gastric cancer of 1 to 20. According to the statistics of Maydl and Schlesinger, the duodenum is affected in about 2 per cent. of the cases of primary malignant disease of the intestine.

The great majority of duodenal cancers belong to the cylinder cell variety, but spheroidal cell growths are not uncommon; while, according to Atkinson, colloid cancer is relatively frequent. Adeno-carcinoma usually encircles the gut, and gives rise to a contraction of its lumen, which, viewed from the outside, looks as though a piece of string had been tied tightly round the bowel. Less commonly the growth infiltrates the walls for some distance above the stricture cell, and gives the diseased tissues a funnel-shaped appearance. The spheroidal carcinomata either take the form of soft flat excrescences, or of deep ulcers, with elevated irregular edges and fungating bases.

The disease may occur at any part of the duodenum, but is most frequent in the second or vertical portion, where its seat of election is the mucous membrane covering the biliary papilla. Out of fifty-one cases, the first part was affected in eleven, or 21·5 per cent., the second in twenty-nine, or 57 per cent., and the third in seven, or 13·5 per cent., while in the remaining 8 per cent. the disease involved the whole or greater portion of the bowel.

ETIOLOGY.—Like simple ulcer in the same situation, a malignant growth is more frequent in men than in women, no fewer than thirty-seven out of the fifty-one cases being of the male sex. The average age at the time of death was 53 years, the mean duration of life in the male case being 52 years, and in the female 54 years. Nathan-Lorrier, however, found that in rather more than one-third of the cases he collected, the patient was over 70 years of age. The disease is apt to follow a chronic ulcer; at least ten instances in which this sequence of events occurred having been placed on record (Perry and Shaw, Nathan-Lorrier, Letulle). In other cases, and more especially in women, the carcinoma appears to be associated with the presence of gall stones.

SYMPTOMATOLOGY.—The symptoms of duodenal cancer vary according to the situation of the growth. When the first or horizontal portion of the bowel is affected, the patient presents all the indications of pyloric stenosis, and a differential diagnosis is extremely difficult. Disease of the second or vertical part is apt to involve the orifice of the common bile duct, that its location may often be determined during life by the coexistence of jaundice and enlargement of the liver, while a stricture of the duodenum below the biliary papilla is usually attended by bilious vomiting and the presence of pancreatic juice in the ejecta. It is therefore convenient to consider the clinical aspect of the disease, according as it is situated *above, around, or below* the biliary papilla.

1. *Carcinoma above the biliary papilla (supra-ampullary or parapyloric cancer).*—In this position the growth may either form a ring round the bowel, just below the pylorus, or produce a deep ulcer with overhanging edges, the base of which is adherent to the liver or pancreas. In both cases the lumen of the intestine is considerably diminished, though never entirely obstructed. The complaint is chiefly encountered in men of middle age, and sometimes follows simple ulceration.

The initial symptoms are somewhat indefinite, and principally consist of discomfort and flatulence after meals, acidity, loss of appetite, and general debility. There are also slight but progressive loss of flesh, and marked pallor of the mucous membranes. After a month or two pyrosis makes its appearance, and is followed within a short time by vomiting. At first the emesis may only occur about once a week, and is accompanied by amelioration of the other symptoms, but it gradually becomes more and more frequent, until finally it takes place once or twice every twenty-four hours. The vomit consists of an acid, sour-smelling liquid, mixed with masses of undigested food. Free hydrochloric acid is uniformly absent, but lactic acid may be present in excess. It is usually stated that the ejecta are free from bile, but, as a matter of fact, a severe attack of retching is not infrequently accompanied by the rejection of a green bilious fluid which has regurgitated through the incomplete stricture. At this period severe pain may be experienced in the epigastrium or right hypochondrium shortly after meals, and is almost always an indication that the growth has undergone superficial ulceration. Hæmatemesis is less frequent than in cancer of the stomach, but traces of altered blood may sometimes be observed in the stools, and occasionally there is severe melæna. In the early stages of the complaint the bowels are confined, but subsequently diarrhœa may supervene, and prove difficult to control. Bile is usually present in the stools, and, according to Charon and Ledegank, colloid material may often be recognised in the evacuations when the disease has undergone that form of degeneration.

On examination the stomach is found to be greatly dilated, and its contractions are often visible through the thin parietes. In about 60 per cent. of the cases in which the disease is situated close to the pylorus, a tumour may be detected upon palpation, and is sometimes large enough to be evident upon inspection. It is usually oval or globular in shape, smooth on the surface, dull on percussion, painful, and slightly movable; but if it is adherent to the liver or pancreas, its outlines are less definite, and the presence of the colon in front of it may endow it with a resonant note.

The subsequent course of the disease is similar to that of pyloric cancer. Ascites may occur from carcinosis of the peritoneum, or pressure upon the portal vein, while jaundice may result from secondary growths in the liver, or from extension to the biliary papilla. Perforation into the general cavity of the peritoneum is a rare event, but a slight leakage not infrequently gives rise to a localised abscess which burrows upwards to the diaphragm, or points near the umbilicus.

2. *Carcinoma in the vicinity of the biliary papilla* (*cancer of the second portion of the duodenum or periampullary*).—In the second part of the duodenum the growth may either commence in the mucous membrane covering the papilla, or at some spot in its vicinity. In the former case the first indication is usually jaundice, while in the latter the signs of pyloric or intestinal obstruction precede those which arise from a block of the bile duct.

Carcinoma of the papilla is usually of the cylinder-cell type, and takes the form of a soft growth, which subsequently ulcerates. As a rule, a yellow tinge of the skin and conjunctivæ is the first symptom to attract attention, and it may be several weeks before pain or vomiting develops. In other cases the icterus occurs quite suddenly after an attack of sickness, or its onset may be heralded by repeated chills and intermittent pyrexia. It is worthy of notice that the coloration of the skin is seldom very intense, and that the bronzed or olive tint that accompanies malignant disease of the bile duct is seldom observed, while not infrequently the jaundice alternately deepens and fades, or appears to be favourably affected by saline aperients. When ulceration occurs, the growth which obstructed the orifice of the duct may be quite destroyed, and the bile once more find a free exit into the bowel. Under these conditions the icterus either disappears completely, or the urine alone continues to give indication of the presence of bile in the circulation.

The subsequent course of the disease depends upon the extent of the growth and the development of complications. As a rule, the jaundice continues with varying intensity, and the patient steadily loses flesh and strength. The appetite is often better preserved than in gastric cancer, but there is usually great distaste to fats, and sometimes excessive thirst. The tongue is foul, pain and flatulence are experienced two or three hours after every meal, and constant nausea or eructations of sulphuretted hydrogen are a frequent source of complaint. Vomiting is seldom absent, and, at this stage of the disease, usually occurs once or twice a day. The ejecta are copious in quantity, and consist of a brownish sour-smelling fluid, which deposits a thick sediment of undigested food, but is usually devoid of free hydrochloric acid. Notwithstanding the presence of jaundice and the absence of bile from the stools, the vomit occasionally exhibits a bright green colour. Hæmatemesis is comparatively rare, but altered blood is not infrequently seen in the evacuations.

On examination, the epigastrium is found to be slightly distended, and there may be some degree of rigidity of the right rectus muscle. The liver is invariably enlarged, and its lower border extends for an inch or more below the costal margin. Careful palpation will also reveal the presence of a distended gall bladder, in the form of an elongated, elastic tumour, which is attached to the under surface of the liver, and is capable of slight lateral displacement. At first it is situated near a vertical line drawn from the tip of the ninth rib, but, as the liver enlarges, it may be pushed several inches to the right. A tumour due to the intestinal growth can seldom be detected, but if the pancreas, retro-peritoneal glands, or the omentum are invaded, a hard, nodular, and painful mass may be felt in the region of the navel. Enlargement of the stomach is always present, and in many cases the contractions of its hypertrophied walls are visible through the abdominal parietes. Although death usually ensues from inanition at the end of six to eight months, it may occur at a much earlier period from toxæmia or other biliary complications.

Case 1.—A woman, æt. 54, was admitted into the London Temperance Hospital in a comatose condition, with deep jaundice. Her husband stated that, about nine weeks previously, she had been seized with pain and sickness after eating some pickled pork, and on the next day had become yellow. The appetite had been bad, and she had complained of feeling weak, but had not lost flesh to any appreciable extent. Two days before admission into the hospital, she had become drowsy and had vomited several times. The patient was a stout, well-developed woman. The skin was bright yellow, and the urine contained a large quantity of bile, but no albumin nor sugar. There was profound coma with laboured respiration, a slow feeble pulse, and dilated pupils. The liver extended nearly 3 in. below the margin of the ribs, and presented a sharp edge and smooth surface. The gall bladder formed a well-defined tumour to the right of the mammary line. The stomach appeared to be normal in size, and no other abdominal tumour could be detected. The gastric contents, extracted by a tube, contained a trace of free hydrochloric acid. Death took place in a few hours.

Necropsy.—The liver was much enlarged and its tissue deeply bile-stained. The gall bladder contained 8 oz. of green bile, and the cystic, hepatic, and common ducts were greatly dilated. When the duodenum was opened, an ulcer the size of a shilling, having a hard, irregular edge and fungating base, was found to occupy the position of the biliary papilla. Vater's ampulla was dilated, and its opening on the floor of the ulcer was obscured by a small fungoid growth. There were no secondary deposits in the liver, but three lymphatic glands behind the peritoneum were enlarged. The duodenal growth proved to be a cylindrical cell carcinoma.

Occasionally the patient is attacked by a succession of rigors, accompanied by irregular pyrexia and delirium. Severe pain is experienced in the right hypochondrium and epigastrium, and vomiting is urgent. Rapid enlargement of the liver takes place, the jaundice deepens, and death usually occurs within a week. In a case of this kind which recently came under my care, carcinoma of the head of the pancreas with portal pyæmia was diagnosed, but the necropsy showed a small cancerous growth of the biliary papilla, with purulent infiltration of the hepatic and pancreatic ducts.

In rare instances suppurative cholecystitis results from a pyæmic infection of the bile duct, and may terminate by perforation of the gall bladder, as in the following case recorded by Cockle:—

Case 2.—A coal porter, æt. 53, was admitted into hospital on February 5, 1883, for slight jaundice. He had enjoyed fairly good health until Christmas, when he caught cold. Since then he had had slight rigors and had lost flesh and strength, but had not complained of pain. On admission the patient was emaciated and slightly jaundiced. The margin of the liver extended about 1 in. below the ribs in the nipple line. There were neither pain, œdema of the legs, nor ascites; the fæces were pale.

February 15.—Rigors; temperature, 101°·2; pulse, 100.

February 17.—Jaundice more intense; liver dulness extended 3½ in. below the costal margin. From the lower border of the liver, and continuous with it, there seemed, on palpation, to be an enlargement of firm consistence, which extended to within 2 in. of the iliac crest, and yielded a resonant note on percussion, being apparently overlapped by the distended colon. Swelling not tender. Patient very drowsy and thirsty. Temperature, 103°·2.

February 19.—Jaundice increased; swelling larger; liver dulness reached iliac crest; no pain, but tenderness on palpation over the liver.

February 20.—The localised swelling has increased in size, and fluctuation could be detected. Slight œdema of the abdominal wall; patient weak and torpid, with hectic flush on cheeks; pulse, 100; temperature, 102°·7.

February 21.—Patient suddenly became worse; acute pain in the abdomen, which was distended and tympanitic. Died the following day.

Necropsy.—The peritoneal cavity contained several pints of sero-bilious fluid and about a quarter of a pint of pus, which escaped from a perforation in the gall bladder. The intestines were coated with recent lymph and the coils glued together. The gall bladder was enormously dilated, and measured, when empty, 8 in. in length and 4½ in width. On its under surface was an opening the size of a sixpence, with thickened and ragged edges. The common bile, cystic, and hepatic ducts were all dilated. On opening the duodenum a soft growth was found, entirely surrounding the orifice of the bile duct and invading the intestine for 3 in. in its long axis, and involving half its circumference. Above the growth the bowel was much dilated. The lymphatic glands in the neighbourhood were enlarged, but there were no metastases in the liver. On section the growth proved to be a spheroidal cell cancer.

When carcinoma attacks the wall of the duodenum, and only invades the biliary papilla during the course of its growth, the clinical picture it presents is somewhat different to the preceding. Should the disease have commenced high up, the initial symptoms are those of pyloric obstruction. Pain or discomfort is experienced two or three hours after food, and there are usually flatulence, acidity, and vomiting, with signs of hypertrophy and dilatation of the stomach. The vomit is usually devoid of free hydrochloric acid, but occasionally it presents a green colour owing to regurgitation of bile through the partially obstructed bowel. Hæmatemesis and melæna may occur from ulceration of the growth, and may even prove fatal. Should the disease undergo colloid degeneration, small semi-transparent granules of colloid material sometimes appear in the fæces.

When the growth develops below the level of the papilla, the first symptoms are those of obstruction of the bowel, with constant vomiting of bilious fluid containing trypsin. In either case its extension is to the orifice of the bile duct, is followed by jaundice, with enlargement of the liver and gall bladder. It should be noticed, however, that even when this complication ensues, a certain amount of bile may still appear in the vomit or fæces, while in some cases the only indication of biliary obstruction consists in the continued presence of bile in the urine, and distension of the gall bladder.

3. *Carcinoma below the biliary papilla (cancer of the third portion of the duodenum, infra-ampullary or juxtajejunal).*—This usually occurs in the form of an annular growth, which produces a considerable degree of stenosis. Both the stomach and the duodenum above the disease are much enlarged, and the pyloric orifice is dilated. As in the preceding varieties, the first symptoms consist of flatulence and discomfort after meals, acidity, loss of appetite, and gradual emaciation. After the lapse of a few months the vomiting appears, and persists until the end. The tongue now becomes thickly coated, the thirst excessive, and there is marked cachexia and rapid loss of flesh. The bowels are obstinately confined, but the stools are seldom quite devoid of bile, and occasionally contain altered blood.

The character of the vomit constitutes one of the most important features of the cases. It always contains bile, which gives it a bright green colour, and if the patient is restricted to a semi-solid diet, the ejecta may closely resemble chopped spinach. The liquid obtained by filtration is neutral or slightly alkaline in reaction, and, if warmed to the temperature of the body, is usually capable of digesting fibrin, owing to the fact that it contains pancreatic juice. The sediment that remains upon the filter paper consists of undigested food in a state of fine subdivision, and is quite unlike the bulky masses which are vomited in cases of pyloric stenosis. From time to time attacks of intestinal obstruction supervene, attended by incessant vomiting and obstinate constipation. On these occasions from 10 to 15 pints of alkaline bilious fluid may be vomited in the course of twenty-four hours, notwithstanding the fact that the patient has taken nothing by the mouth. The urine is greatly reduced in amount, and may be entirely suppressed, while that which is voided is alkaline in reaction and opaque from an excess of earthy phosphates. When boiled with nitric acid, it sometimes assumes a dark red or port-wine colour, owing to the presence of a colourless chromogen, allied to indol and indican, which has been produced by decomposition in the dilated bowel. A somewhat similar reaction is sometimes obtained in cases of melanosis from the melanogen in the urine, but in this instance the addition of perchloride of iron to the urine produces a brown coloration, a reaction which is absent in cases of duodenal cancer. In rare instances the chromogen is changed to indican in the body, and the urine has a distinct blue colour when voided. Rolleston noted an excess of creatinin in the case which he recorded. Symptoms of auto-intoxication are often present at this stage of the complaint, and consist of urgent dyspnœa, restlessness, palpitation, thirst, and delirium. Intense itching of the skin, like that met with in biliary and renal toxæmias, is sometimes observed, and urticarial eruptions occasionally follow the acute attacks of duodenal obstruction. Examination of the abdomen shows the stomach to be much enlarged, and a succussion splash may be obtained as far outwards as the right mammary line, or even in the lumbar region. This latter phenomenon is apt to be ascribed to dilatation of the pyloric region of the stomach, but is really due to the duodenum, which, being greatly enlarged above the stricture, forms a distended sac behind and to the right of the pylorus. When the disease merely forms a ring round the bowel, no tumour can be detected by palpation, but if the growth is accompanied by enlargement of the retroperitoneal glands, or has infiltrated the pancreas, an indefinite hard mass may be felt to the right of the umbilicus. Exploration of the stomach with a soft tube elicits three facts of considerable importance. In the first place, it may be observed that, after the organ has been apparently emptied, a fresh gush of fluid occurs when the patient coughs or inclines his body to the left side, a phenomenon which is obviously due to regurgitation of the contents of the duodenum through the incompetent pylorus. Secondly, after the stomach has been evacuated, a succussion splash may still be obtained over a limited area to the right of the navel, owing to the presence of fluid in the duodenum. Finally, after the stomach has been washed out overnight, and no food taken in the meanwhile, a quantity of bilious fluid may be extracted in the morning. These three phenomena, taken in conjunction with the physical signs aforementioned, render the diagnosis of stricture of the third part of the duodenum almost a matter of certainty.

Case 3.—A carpenter, æt. 56, was admitted into hospital with the following history. He had always been in good health until five months previously, when he was suddenly seized with a bilious attack, and vomited for two days. Since that time he had suffered from flatulence and discomfort after meals, loss of appetite, and steady emaciation. Latterly he had vomited once or twice each day, and had become very weak. The bowels were confined, and micturition was accompanied by a scalding pain in the penis. On examination, the patient was found to be very thin and anæmic, with a purple flush on either cheek, which was stated to have developed during the course of his illness. The pulse was small and compressible, the tongue covered with a creamy fur, the breath offensive, and the temperature subnormal. The bowels were confined, but the stools contained bile. The lower border of the stomach extended nearly 1 in. below the level of the navel, and its pyloric portion appeared considerably dilated, as a succussion splash could be obtained as far outwards as the right anterior axillary line. The organ could be seen to contract slowly from left to right. The liver was enlarged, and the lower edge projected 1 in. below the costal margin. There was neither ascites nor jaundice, nor could any localised tenderness or tumour be detected in the abdomen. The thoracic viscera were normal. The vomit during the first night in the hospital amounted to 18 oz., and consisted of an alkaline opaque fluid of a deep green colour, which deposited a flocculent precipitate on standing. Gmelin's test gave a positive reaction, and, after the addition of a few grains of bicarbonate of sodium, the filtrate digested fibrin. The urine was much reduced in amount, and contained a trace of albumin. After the stomach had been washed out overnight, and no food taken in the interval, 13 oz. of bilious fluid were extracted by a tube on the following morning, and even after the organ had been apparently emptied a splash could still be obtained to the right of the umbilicus. Daily lavage, combined with careful dieting, afforded considerable relief for the first ten days, but the loss of weight still continued. At the end of a fortnight it was noted that the patient was not so well. Vomiting occurred each night despite the lavage, and the right lobe of the liver had increased in size, and presented a small superficial nodule. Attacks of extreme restlessness alternated with periods of somnolence, and at night-time he suffered from fits of choking, accompanied by urgent dyspnœa. On the eighteenth day after admission the bowels ceased to act, and incessant vomiting set in, which lasted for three days, and precluded the administration of nourishment by the mouth. During this period from 6 to 9 pints of thin alkaline green fluid were rejected every twenty-four hours. The urine was scanty, and assumed a dark red tint when boiled with nitric acid. A week later fluid was detected in the peritoneal cavity, and the patient complained of great distension after meals. A gland above the left clavicle was also found to be enlarged, and the nodule in the right lobe of the liver was more distinct. A few days afterwards, the temperature suddenly rose to 101° F., and he became delirious. There was no cough or expectoration, and the respirations were only 24 per minute. The following day the temperature had fallen to 99°, but the patient was semi-unconscious, with a dry tongue and a pulse rate of 136. Comparative dulness on percussion was detected at the base of the right lung, and a few moist crepitations were audible on auscultation. During the evening the temperature rose to 102°, the coma deepened, and death occurred in the early morning.

Necropsy.—The anterior portion of the abdominal cavity was chiefly occupied by two thin-walled sacs, which lay side by side. The one on the left consisted of a dilated stomach, while the other, which was ovoid in shape and 8 in. in length, with a maximum circumference of 13 in., represented the upper two-thirds of the duodenum in a state of extreme distension. When the latter was laid open, its lower end was found to be the seat of an ulcerated malignant growth, which had so contracted the lumen of the bowel that it hardly admitted the tip of the index finger. The retroperitoneal glands were much enlarged, and the liver contained four secondary growths. There was recent pneumonia in the lower lobe of the right lung. The growth was a columnar-cell cancer.

Cases have been recorded in which the whole or greater part of the duodenum was infiltrated with carcinoma, and converted into a thick, rigid tube of small diameter. The symptoms that accompany this rare form of disease are essentially those of chronic intestinal obstruction, accompanied by excessive vomiting and dilatation of the stomach. Jaundice is an inconstant phenomenon, but melæna is not infrequent. In Arrachard's case a large membranous cast was evacuated after the administration of an aperient, and death was preceded by troublesome diarrhœa.

Duration and Complications. — In my series of cases the average duration of the complaint was about seven months, the extreme limits being three and eighteen months. As a rule, the fatal event is due to exhaustion from inanition, but when it occurs at an early period it may take place from auto-intoxication or some other biliary complication. Fatal hæmorrhage has only been recorded twice, and perforation with general peritonitis is also rare. An intraperitoneal abscess is rather more common than in simple ulcer, and usually points at the umbilicus, or makes its way towards the upper surface of the liver. Suppuration behind the peritoneum is very exceptional. Occasionally the growth produces an external fistula, or establishes a communication with the transverse colon or with the gall bladder. In the case recorded by Trevelyan, death occurred from tetany.

Diagnosis.—Primary malignant disease of the duodenum is accompanied by two varieties of symptoms, one of which is common to all cases, while the other varies with the situation of the growth. The former comprises progressive emaciation, cachexia, loss of appetite, vomiting, hæmatemesis, or melæna, constipation alternating with diarrhœa, and pain in the abdomen after meals, with the signs of dilatation of the stomach, and perhaps a palpable tumour. The latter, or localising symptoms, on the other hand, consist of jaundice, with enlargement of the liver and distension of the gall bladder, attacks of intestinal obstruction, vomiting of bile and pancreatic juice, and the presence of chromogen in the urine, with the signs of dilatation of the stomach and duodenum, incompetency of the pylorus, and perhaps enlargement of the liver and gall bladder.

Disease of the *first part of the duodenum* has to be distinguished from benign and malignant strictures of the pylorus, and from the effects of pressure exerted upon the bowel by an external tumour.

1. Pyloric stenosis due to the cicatrisation of a simple ulcer develops very gradually, and is seldom accompanied by rapid emaciation or cachexia. There is almost always a history of previous severe pain after food, with one or more attacks of hæmatemesis. Pain and acidity are chiefly experienced during the night, and the vomit may be stained with bile. Free hydrochloric acid is present in excess, and the existence of hypersecretion may be determined by evacuating the stomach in the early morning. Although the viscus may be greatly dilated and hypertrophied, no tumour can be felt, and if suitable treatment be adopted the general health may continue good for many years.

2. From cancer of the pylorus the diagnosis is very difficult, since the symptoms and signs of the two diseases are practically identical. It is stated, however, that when cancer attacks the upper duodenum the appetite is less affected than in the gastric complaint, that free hydrochloric acid may continue for a consider-

able time, that bile is not infrequent in the vomit, and that diarrhœa is apt to alternate with constipation. If a tumour is present, it is usually situated more to the right of the median line than is the case with a pyloric growth.

3. Pressure upon the first part of the duodenum may be caused by an enlarged gall bladder, a tumour of the liver, an aneurysm of the cœliac axis or of the hepatic artery, or by a growth of the omentum, kidney, pancreas, or retroperitoneal glands. These forms of obstruction develop more slowly and are less severe than that produced by cancer of the duodenum. Hæmatemesis and cachexia are rare, and the loss of flesh is only proportional to the urgency of the gastric symptoms. The tumour varies in its character and attachments according to its mode of origin, and free hydrochloric acid may usually be detected in the gastric contents.

Malignant disease of the *second part of the duodenum* may be confused with cancer of the pancreas or of the ampulla of Vater, with gall stones, and with a simple chronic ulcer in the same situation.

1. A growth of the head of the pancreas, or of the small diverticulum into which the common bile and pancreatic ducts open (ampulla of Vater), is accompanied from the first by jaundice, which soon becomes intense, and usually persists throughout the whole course of the disease. The gastric phenomena, on the other hand, are of subordinate importance, and mainly consist of flatulence after meals, a bitter taste in the mouth, and inability to digest fats. The stomach is not dilated, there is no periodic vomiting, bile is absent from the stools, and the secretion of hydrochloric acid usually persists.

2. Gall stones are more common in women than in men, while the reverse is the case in duodenal cancer. The jaundice is preceded by severe spasmodic pain, and may continue for several months without seriously affecting the general health. Even when emaciation is a marked feature of the case, the patient does not usually display that loss of energy and physical debility which is so constant in cancer of the digestive organs. Periodic vomiting with the signs of dilatation of the stomach is absent, there is no hæmatemesis or melæna, and the initial enlargement of the gall bladder disappears after a short time.

3. Simple chronic ulcer of the duodenum is usually accompanied by pain some hours after food, with tenderness upon pressure above and to the right of the navel, and occasional attacks of melæna with or without hæmatemesis. Loss of flesh and appetite are unimportant symptoms, and the degree of anæmia varies with the severity of the hæmorrhage. Should the disease ultimately produce stenosis of the bowel, the gastric dilatation is accompanied by hyperchloric acidity.

Obstruction of the *third part of the duodenum* may arise from other causes than malignant stricture, since a tumour of any neighbouring viscus may exert pressure upon the bowel. It is also possible that undue tension of the transverse mesocolon, or enlargement of the superior mesenteric vessels, may compress this portion of the gut. Of the internal diseases the impaction of a gall stone and the cicatrisation of a simple ulcer are the most important. In all these cases, however, the antecedent symptoms differ greatly from those of duodenal carcinoma, there are seldom cachexia and rapid loss of flesh, and the discovery of a tumour helps to elucidate the nature of the primary disease. A gastro-biliary fistula is also accompanied by vomiting of bile, but there is usually a history of gall stones, while dilatation of the stomach and duodenum is absent.

Treatment.—This must be conducted upon the same lines as that of cancer of the pylorus. Lavage should be performed night and morning, the bowels maintained in regular action, and the diet adjusted to the necessities of the patient. Excision of the growth is rarely feasible, but gastro-enterostomy often prolongs life for several months.

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VOLCANIC ACTION AS A CAUSE OF OUTBREAKS OF EPIDEMIC DISEASE.[1]

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The subject of the following essay is in accordance with the terms of the bequest of the late Dr. John Parkin, Fellow of the Royal College of Physicians, Edinburgh, the founder of the Parkin Prize for essays on certain subjects connected with medicine. Judging from his published works on this subject, Dr. Parkin included under the head of Volcanic Action all the natural phenomena associated with the molten interior of the earth, namely, volcanic eruption, earthquakes, etc., and it is chiefly the relation of the latter to epidemic outbreaks that I have considered in this essay. Before going further, I will very briefly review what literature I have been able to find bearing on the subject.

The first instance which I can find of any author definitely attributing outbreaks of epidemic disease to volcanic activity is an article written by Mr. Webster.[2] In 1843 a work was published in Paris by Dutrouleau and Gounet, in which they described various ailments and lesions which were due to an earthquake.[3]

In 1851, John Parkin, the physician already referred to, published a large work,[4] in which he strongly advocated the claim of volcanic action to be regarded as the cause of cholera and other epidemic diseases. He advanced as his arguments the following characteristics which volcanic action and cholera epidemics have in common:—(1) Progression along particular lines; (2) more marked towards the sea and near large expanse of water; (3) limited duration—periodical return, with total cessation in a particular locality after certain definite periods. His views were very ably attacked, as not being in accordance with facts, by the then Registrar-General in his Report on the Cholera Epidemic in India, published shortly after the appearance of Parkin's work. Dr. Parkin wrote a reply in support of his theory, illustrating it with several maps designed to show the coincidence of cholera tracks with lines of volcanic action. That Dr. Parkin's theory had a fairly wide acceptance, is shown by the fact that his work was reproduced in a Spanish journal.[5]

Geographical Distribution of Volcanic Action and Disease.—In a map illustrating Geikie's "Physical Geography," and showing the geographical distribution of volcanic activity throughout the world, the countries most subject to earthquakes are seen to be Portugal, Italy, Beloochistan, Afghanistan, the Bengal Presidency of India, Japan, Mexico, and the Pacific Coast of South America. All the areas marked light blue by Professor Geikie are, he says, liable to occasional earthquake shocks of varying degrees of intensity. Volcanic vents, both active and dormant, are chiefly to be found in the following regions:—Iceland, the Canary Isles, South Italy, and Sicily, the islands encircling the Pacific Ocean, including especially Japan, Philippine Islands, and Sandwich Islands, the Islands of the Malay Archipelago, including Java and Sumatra, the West Indian Islands, Mexico, and the Pacific Coast of South America.

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[1] Awarded Parkin Prize, 1900.

[2] "On the Connection of Earthquakes with Epidemic Disease," Medical Report, New York, 1801.

[3] "Relation medico-chirurgicale de tremblement de terre."

[4] "The Remote Cause of Epidemic Diseases," 1851.

[5] *Boletin de med. y cirug.*, Madrid, 1855.

DISEASES MOST PREVALENT IN VARIOUS VOLCANIC DISTRICTS.—The following table is designed to illustrate the above, the death-rate being added where obtainable:—

Name of Country.	Most Prevalent Diseases.
Iceland	Enteric fever. Endemic pneumonia.
Italy	Malaria . Deaths—5·0 per 10,000. Enteric fever „ 9·6 „ Enteritis, Diarrhœa „ 29·4 „
Portugal	Malaria. Enteric fever.
Canary Islands	Diarrhœal diseases. Leprosy and phthisis are common.
Japan	Cholera.
India (Bengal Presidency)	Enteric and cholera.
Beloochistan	Enteric and dysentery.
Afghanistan	
Java	Malaria and dysentery.
Sumatra	
Mexico	

This next table shows the total death-rates per 1000 in several countries, volcanic and non-volcanic:—

Death-Rate per 1000, *calculated from Average of Ten Years.*

Great Britain	19·2
France	22·0
Germany	25·7
Switzerland	21·0
Sweden	17·6
Italy	28·1
Portugal	23·4
Sandwich Islands	26·0
Jamaica	23·0

The bare statistics of these tables at first sight seem to support the theory of earlier writers, namely, that there is a higher death-rate in volcanic than in non-volcanic countries, but almost certainly local conditions of soil, climate, latitude, etc., are the chief determining factors. Nor does there appear to be any especially fatal disease common to volcanic countries in different parts of the globe. Cholera, enteric fever, and dysentery, as Parkin observed, are certainly very deadly in many volcanic countries situated in the tropics, yet the same diseases are comparatively rare in equally volcanic countries situated in a more temperate zone, and are replaced, as chief cause of death, by some other malady, *e.g.* malaria in Italy and Portugal. It seems, therefore, that the presence of volcanic activity in a country as a whole has no obvious effect on the death-rate or incidence of epidemic disease. However, it is well in this respect to compare the statistics of two parts of one same country, subject and not subject to volcanic disturbance respectively. On referring to Geikie's map of the geographical distribution of volcanic activity, it may be seen that in the United States the Southern States on the Atlantic seaboard (in fact, south of New York) are subject to earthquakes (the earthquakes at Charleston being perhaps the best known of recent years), while the rest of the States on the same seaboard are quite free from such visitations. The volcanic area includes the following States:—Virginia, Kentucky, North and South Carolina, Alabama, Georgia, Tennessee, and Florida.

The following table gives the vital statistics of the States included in the volcanic area and of the States adjoining:—

	State.	Total Death-rate.	Malaria.	Enteric.	Phthisis.
Volcanic Area.	Virginia	16·3	23·7	Average for the four States. 30·1	141·7
	North Carolina	15·8	44·6		
	South Carolina	15·4	46·4		
	Kentucky	14·3	31·3		
	Tennessee	16·8	35·2	22·3	111·6
	Alabama	14·2	73·4		
	Georgia	13·9	49·1		
	Florida	11·7	95·2		
	Average	14·8	49·8	26·2	126·6
Non-Volcanic Area.	Maine	14·6	2·8	Average for the eight States. 18·0	147·0
	New York	17·3	11·4		
	Pennsylvania	14·9	6·3		
	Michigan	12·1	16·2		
	New Hampshire	16·1	3·0		
	Vermont	15·1	5·9		
	Massachusetts	18·6	2·3		
	Rhode Island	17·0	0·8		
	Average	15·0	6·0	18·0	147·0

In the statistics just quoted, the total death-rate is that per 1000 from all causes; and that from malaria, enteric, and phthisis, the number of deaths from each of these diseases per 1000 deaths from all causes.

On comparing the figures, it will be noticed that, while the total death-rate is practically the same in the two areas, the death-rates from malaria and enteric are very much higher in the area subject to volcanic activity than in the other. The death-rate from phthisis is, however, somewhat smaller in the former than in the latter part of the country. Turning now to the statistics of another volcanic country, namely, Italy, we see that there is an area of maximum volcanic disturbance made up of South Italy, Sicily, and the Lipari Islands, which includes the famous vents of Vesuvius, Stromboli, and Etna.

The next table gives the vital statistics for this area of Italy, and for the adjoining part of the country:—

Number of Deaths in 10,000 *of the Population.*

	Department.	Malaria.	Enteric.	Dysentery.	Diarrhœa.	Phthisis.
VOLCANIC.	Sicily .	8·4	14·3	6·0	40·0	Average considerably below that for the whole of Italy.
	Calabria .	20·4	10·7	5·0	35·0	
	Basilicata .	27·5	9·4	8·0	56·0	
	Apulia .	14·6	18·7	2·40	44·6	
	Campania .	2·5	7·2	2·63	28·6	
	Average .	14·6	12·0	4·8	40·8	...
NON-VOLCANIC.	Abruzzio Molise .	8·4	9·6	0·60	38·5	...
	Latium .	13·2	3·2	0·60	22·5	...
	Marches .	0·8	6·2	0·96	28·9	...
	Umbria .	1·5	6·6	4·0	22·0	...
	Tuscany .	1·4	11·2	1·9	19·2	...
	Average .	5·0	7·7	1·6	26·2	...

It will be seen from the above tables that the death-rates from malaria, enteric, dysentery, and diarrhœal diseases are all considerably higher in the area most disturbed by volcanic phenomena, than in the adjoining part of the country farther removed from the chief centres of such activity. According to Davidson,[1] the average death-rate from phthisis for the whole of Italy is 23·9 per 10,000, but that the Departments of Sicily, Basilicata, Calabria, and Apulia all show death-rates from this disease considerably below the mean.

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[1] "Geographical Pathology," vol. i. p. 233.

Comparing the American and Italian statistics, it is seen that they show somewhat similar results, namely, an increased death-rate from malaria, enteric, etc., with a lessened death-rate from phthisis, in the areas associated with volcanic activity as compared with the non-volcanic regions. That these figures are not mere coincidences, and that the increased death-rate in the districts described is really due to their liability to volcanic phenomena, rather than to other local conditions, are deductions which I feel that I should be very cautious in drawing. It does not, however, seem to me to be unlikely that volcanic action may be one of various determining factors of the high mortality, especially in towns possessing anything like modern water supply and drainage systems.

THE EFFECT OF EARTHQUAKES IN THE PRODUCTION OF EPIDEMIC DISEASE.—Taking volcanic phenomena *seriatim*, I will first consider the effects of earthquakes. When we consider that even in England earth vibrations are now and again sufficiently severe to cause leakages from drain and water pipes,[1] it is not surprising to learn that in towns situated on lines of volcanic activity such a state of things has not unfrequently been found to exist in a very marked degree, by medical committees appointed to investigate the cause of outbreaks of epidemics, *e.g.* in Naples and Yokohama. That towns thus situated should be of all towns particularly subject to epidemics of disorders associated with faulty drainage, is exactly what one would expect. To give statistical proofs of this fact is, however, a matter of some difficulty, owing to the impossibility in many cases of getting access to reliable figures. However, the evidence which I have been able to collect bearing on this subject has convinced me that volcanic action in the shape of earthquakes is responsible for outbreaks of epidemic disease, especially of cholera and typhoid, occurring in towns such as I have just described, and that these outbreaks are directly due to the rapid dissemination of the causes of these diseases from an infected locality by means of the water supply, which has become contaminated with sewage owing to the leaking condition of the pipes, cesspools, etc. In answer to my request for some information as to the attitude of Japanese sanitary authorities in this respect, Mr. J. Milne, late Professor of Seismology at the University of Tokio, tells me that "of course wells, water, and drain pipes are interfered with by earthquakes," and it is clear that the making of these structures proof against danger from earth vibrations is a matter of great importance for Japan, since, as at Tokio at the present moment, modern systems of underground water and drainage are rapidly replacing more primitive methods in that country.

EXPERIENCE OF THE TOWN OF YOKOHAMA.—The history of the town of Yokohama is one of very great interest, as affording evidence of the close relationship, as cause and effect, existing between damaged water and drainage systems and epidemics of disease. This town is notoriously subject to constant shocks of earthquake, often of a very severe nature; in fact, it is situated on one of the chief lines of volcanic activity in Japan.

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[1] *Trans. Inst. Civil Engineers.*

Turner, writing on the construction of the Yokohama waterworks in 1887,[1] says: "The attention of the municipal authorities of this town was forcibly directed to the insanitary state of affairs, by recurrent epidemics of cholera during the past twenty years, and an official investigation by the late Dr. Geerts proved the close relationship existing between the use of water from polluted sources and the virulent development of choleraic disease." I am indebted to the Asiatic Society of London for permission to read and make the following abstract from the original report.[2] Dr. Geerts gives the following statistics of the cholera epidemic of 1877:—

Persons.	Attacked.	Died.
Inhabitants	731	404
Travellers	21	12
Total . . .	752	416

He then reports the result of "systematic investigation into the nature of the water supply of Yokohama," which appears to have been both well water and water brought by pipes to the town from a distant reservoir, the latter of which was found to be quite pure at its source. The result of an analysis of 2324 samples of water taken from various parts of the town, was that 14·5 per cent. of them were found to be contaminated by sewage. He then goes on to describe the drains, which he found to "consist of narrow leaky drains connected with underground cylinders of pottery." Turner, in the paper already referred to, gives us another account of the drains. He says: "The main drains had flat wooden floors and covers and stone sides, and some were built of brick, and all that were opened were surrounded by earth saturated with sewage." Geerts also stated that "many houses were connected with cesspools of various sizes, many of which were damaged and cracked, thus constituting sources of danger. The descriptions just quoted were not those of the results of a severe recent earthquake, but rather the natural sequence of an almost constant succession of shocks of varying intensity continued over a prolonged period. The investigation convinced Geerts that "the defective condition of the drains was the cause of the bad condition of the drinking water, and the propagation of epidemic diseases, such as cholera, typhoid fever, etc." The result of this report being sent to the Japanese Government was that it was decided to introduce into Yokohama a new high pressure water supply, and to reconstruct the drainage system; and it is evident that it was fully realised that ordinary methods of such construction would have to be largely modified in view of the local conditions, if the new schemes were to permanently save the town from the danger of leaking pipes and the consequent ravages of epidemics, to which it had for long been subject. In Mr. Turner's paper is an interesting account of the modifications adopted, and it may be taken as an expert opinion on the question of how best to prevent damage to underground water carriage systems by earthquakes; and since the satisfactory solution of this problem must do much to improve the health of towns in volcanic countries, I do not think it is irrelevant to briefly notice the plan adopted. Turner says that personal observation convinced him that it would be imprudent to rely upon obtaining watertight structures by brick, masonry, or concrete alone. He therefore encased the service reservoirs and other water receptacles in puddle freely used, and prepared and laid with the greatest care, and used lead joints for the pipes. "Selection and manipulation of the puddle clay, upon which it was felt that the water tightness entirely depended, was directed with the greatest care. The clay was thoroughly aërated and disintegrated by frost during the winter before it was used. It was then cut, watered, and trodden four times *in situ*." 18-in. main pipes were used, jointed with yarn and lead, depth of lead being 2 in., and average thickness of joints $\frac{3}{8}$ in. When laid in gravel soil, brick-in-cement lining was resorted to. Distribution was by lead service pipes. With regard to the new drainage scheme, Dr. Geerts evidently distrusted any form of underground system, for he recommended in his report "the replacement of drains by watertight open conduits, with free water flushing." The drainage of the town was thoroughly reorganised and reconstructed, but whether or not Dr. Geerts' suggestions were adopted I have been unable to find out. The carrying out of these two schemes of improvement has proved very satisfactory for Yokohama. Turner says that the "absence of leakage from any part of the waterwork system, notwithstanding several severe earthquakes and multitudes of smaller shocks, demonstrates the efficacy of puddle properly worked in earthquake countries. The health of the town, as regards epidemic disease, has greatly improved since the improvements, the mortality from enteric fever especially having notably diminished, as reported by Davidson.[1]

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[1] *Trans. Inst. Civil Engineers*, vol. c.

[2] "On the Drinking Water of Yokohama, and the Necessity for its Improvement, in relation to Continual Outbreaks of Cholera," by Geerts, *Trans. Asiatic Soc. of Japan*, 1878, vol. vii.

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[1] "Geographical Pathology," 1892.

The history of Yokohama, summed up briefly, is as follows:—

A town situated in a district constantly disturbed by volcanic activity, had an appalling death-rate from epidemic diseases, especially cholera and typhoid fever. An investigation proved conclusively that the contamination of drinking water by sewage was the cause of the epidemics, and that the cracked and leaking condition of the drainage and water systems was the cause of the contamination. New systems of water supply and sewage removal were then constructed, special precautions being taken to guard against injury to the pipes, etc., by earth vibrations, and, as a result, the epidemics to which Yokohama had grown accustomed are now a thing of the past, and the death-rate from enteric, instead of being enormous, compares very favourably with that of most European towns.

In view of the light thrown by the history of Yokohama upon the relationship of volcanic action to the causation of epidemic disease, it seems to be not at all improbable that a state of affairs similar to what was found in Yokohama might arise in many towns, which are fairly often visited by slight earth shocks, though perhaps they may but rarely amount to what would be popularly called an earthquake.

The city of Naples is a town of this description, its proximity to Vesuvius rendering it liable to frequent earth oscillations, (now and again amounting to definite earthquakes), phenomena inseparable from that of eruption. The following extract from a report on the sanitation of Naples is therefore of much interest:[1]—

> "The imperfections of the drainage and water pipes culminated in a severe cholera epidemic in 1884, during which the total mortality rose to 6971 persons, out of a population of 504,700, or a death-rate of 13·8 per 1000. The drainage works consisted of some fifty principal sewers, emptying into the Bay of Naples, but owing to numerous leakages they had led to all kinds of insanitary dangers."

The fact that very free communication existed between the drainage and the water supply was demonstrated in the following interesting way, for an account of which I have to thank an English doctor living in Naples. On the outbreak of cholera, the sanitary authorities flushed the drains very freely with carbolic acid. As a result, the drinking water became so strongly leavened with carbolic, that the people refused to drink it, imagining that the unwonted taste was due to some poison which had got into the water supply, and was causing the epidemic.

Since that date, new drainage and water-supply works have been constructed, and the health of the town has improved.

THE EFFECT OF THE RIVIERA EARTHQUAKE OF 1887 ON THE MORTALITY FROM EPIDEMIC DISEASE.—It may be remembered that a fairly severe shock of earthquake travelled through the

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[1] *Deutsche Vrtljschr. f. öff. Gsndhtspfg.*, Braunschweig, 1894.

Riviera in 1887, and did a great deal of damage. The destruction of houses, etc., naturally attracted most general attention, but, as one would expect, bearing in mind the experience of Yokohama and Naples, the drainage and water systems also suffered severely. I hear from residents in several of the towns visited by the earthquake, that great cracks were made in the cesspools, and that the drainage pipes were rendered leaky. For some time after the earthquake, the well-known Riviera towns had an unenviable reputation for being unhealthy, and were avoided by visitors in consequence. Hoping that figures might support the statement that the earthquake was followed by epidemics of disease, I have endeavoured to get statistics of the towns in question, namely, Alassio, Porto Maurizio, San Remo, Mentone, Nice, and Cannes. I have only been able to get the figures for Nice, Cannes, and Mentone, and for the following table of the mortality in those towns from enteric fever I am indebted to the courtesy of Dr. Bertillon. Unfortunately, to quote Dr. Bertillon's letter, "Je n'ai pu vous donner les renseignements que depuis 1886. Avant cette époque, ils n'existent pas." The table thus gives the statistics for the year before the shock, the year of the shock, and for the four following years:—

Death-Rate from Enteric Fever: 1886 *to* 1891.

Town.	1886.	1887.	1888.	1889.	1890.	1891.
Nice	35	49	90	80	35	20
Cannes . . .	3	8	13	2	6	2
Mentone . . .	3	9	12	2	1	3
Total . .	41	66	115	84	42	25

The figures show that a serious epidemic of enteric fever broke out in Nice after the earthquake, and that for the two following years the death-rate from this form of epidemic disease was considerably more than twice as high as the average for that town. In both Cannes and Mentone the deaths from enteric were four times as many during the year after the earthquake as in the previous year.

Taking the statistics for the three towns together, it will be noticed that, as compared with the mortality from enteric in 1886, there was a marked increase in 1887, the year of the earthquake, in the following year the number of deaths had nearly trebled, after which the death-rate (though still above the average) gradually declined. I hear also from resident medical men that for some time after the earthquake there was quite an epidemic of septic sore throats. The data afforded us by Yokohama, Naples, and the Riviera towns prove very conclusively that earthquakes may be the cause of outbreaks of epidemics of disease, and since they are due to the damage done to drainage and water supply, it is perhaps as well to briefly refer to various precautionary measures which should be taken by towns liable to volcanic disturbance.

Milne, speaking on the subject, says that the best sites for cities, waterworks, etc., and the best course in which to lay main pipes, may with advantage be determined by a seismic survey, which will indicate the lines of least movement. Low ground, ground that is marshy, also deep sloping ground, or that situated over geological faults, should be avoided.[1] These principles are enforced by the building laws of Manila and Ischia, which were drawn up after their destruction by earthquakes. It would seem that the plan of encasing in puddle clay, which has proved so satisfactory in Yokohama, might also be adopted with advantage.

THE INFLUENCE OF THE EARTHQUAKE AT CHARLESTON, U.S.A., IN 1885, ON EPIDEMIC DISEASE.—I have already briefly referred to the city of Charleston as being situated in the part of the United States subject to volcanic disturbance. A severe earthquake shock visited Charleston in 1885, and several interesting papers were written in the course of the next year upon the influence of the earthquake upon the public health. Two of the most important articles, written by Guiteras and Porcher, I fortunately have for reference. For this advantage I am much indebted to Surgeon-Major Menill, Librarian of the U.S. Army Medical Library, Washington, who kindly sent me copies of both publications.

Guiteras divides the pathological effects produced by the earthquakes under three heads, namely—(1) Mechanical, (2) Nervous, and (3) Epidemic.

The first heading does not come within the scope of this essay, and the epidemics of neurosis I will refer to later. Writing on the subject included under the third heading, he says: "Certain it is that a mild fever prevailed during the months of September and October, and that it went by the name of earthquake fever. It was characterised by catarrh of the air passages, irregular pains, some fever, and occasionally gastro-intestinal disturbances and jaundice. Some suspicion of dengue was at first aroused, but they were soon dissipated. The epidemic of this disease persisted throughout the winter, the pulmonary complications being quite severe. Two facts militate against the view that the epidemic was due to exposure, namely, the frequent presence of symptoms that were not exclusively catarrhal, and the warm and dry weather that prevailed during the seismic period. I may add that the recrudescency of the catarrhal epidemic is culminating at present in an epidemic of pneumonia of low type."

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[1] *Trans. Inst. Civil Engineers*, and Appendix by F. Milne to "Construction of Waterworks" by Burton.

Further on in his paper he notices the great increase in the death-rate from malaria which followed the earthquake, namely, thirty-seven deaths in one quarter as compared with seventeen during the same quarter of the previous year; and this fact is of interest, in view of the much higher death-rate from malaria that we find in the volcanic areas of the States and in Italy, as compared with the non-volcanic.[1] Guiteras and others, whilst observing the fact, do not attempt to explain it, so I may perhaps be pardoned in offering, as a suggestion, the possibility that the mechanical disturbance of the marshy ground may be the cause. It is one of the most generally accepted axioms of the West African Coaster, that the digging or otherwise disturbing virgin soil is of all pursuits the one most liable to be followed by a bad attack of malarial fever. A few years ago, when visiting the railway being built from Lagos into the interior, I was much struck by the fear Europeans had of engaging on this work. They had good grounds, however, since in the preceding twelve months, so I was told, 50 per cent. of the Europeans working on the line had died of malaria, a bad record even for West Africa.

I do not know whether the observed connection between disturbances of virgin soil and incidence of malaria is accounted for by modern theories of malarial etiology, but if the West Coaster's observations are correct, it is only to be expected that malaria should be unusually prevalent in malarious districts after an earthquake. That the malarious district near Charleston were much disturbed by the earthquake, is shown by the fact that "smells like that of gas or sulphur were noticed by passengers travelling to Charleston by the N.E. Railway, which were probably caused by the emanations from the extensive marshes of this region" (Porcher).

In addition to that for malaria, it is to be noticed that, as at Naples and Yokohama, the mortality from enteric fever and choleraic diseases also increased after the earthquake.

Statistics of Death-Rate in Charleston for the corresponding Quarters of the Years 1885 *and* 1886.

Disease.	Number of Deaths.	
	1885.	1886.
Malaria	17	37
Typhoid fever . . .	7	10
Dysentery	0	7
Choleraic diseases . . .	22	38

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[1] *Vide* "Statistics," pp. 8–10,

Unfortunately I cannot obtain statistics of mortality from the so-called "earthquake fever"; presumably it was not a very fatal, although a widely distributed epidemic.

EARTHQUAKES AS A CAUSE OF EPIDEMICS OF NEUROSIS.—*Hysterical symptoms, etc.*—Instances of epidemic hysteria due to various causes are now and again reported in the Medical Journals, and it causes me but little surprise to find that quite a number of travellers and writers in volcanic countries have described epidemics of neurosis which have followed the occurrence of volcanic phenomena. The following types of cases seem to be the most familiar:—

TYPES OF CASES WHICH MAY BE MET WITH IN EPIDEMICS OF NEUROSIS AFTER EARTHQUAKES, ETC.—1. *Various functional disturbances*, namely—(1) Nausea; (2) vomiting; (3) headache; (4) vertigo (5) diarrhœa; (6) frequent micturition; (7) hystero-epilepsy (8) disordered sensation, namely tingling, pins and needles, etc.

2. *Various abnormal mental conditions*, namely—(1) Condition of nervous apprehension; (2) depression and prostration; (3) moral instability—loss of control; (4) mania; (5) insanity.

3. *Functional paralysis*, namely—(1) Paralysis of limbs; (2) railway spine.

Lastly, it appears that some of these symptoms already mentioned may develop into organic lesions, or organic lesions may directly follow the shock; *e.g.* multiple neuritis (two cases recorded by Guiteras), paraplegia, and other forms of paralysis, sometimes ending in a fatal result.

1. *Functional disturbances—Nausea, etc.*—Milne has written some very interesting notes on this subject, from the point of view of a lay observer.[1] He says that a whole community, by repetition of small earthquakes, may be gradually worked up into a state of mental nervousness, and that many are often seized with feelings of nausea and sickness. In one instance, all the pupils of a large school were thus affected. Mr. Milne also quotes from Temple's description of the earthquake at Naples in 1732.[2] Temple says that "the second shock, which was the least terrifying, had a great effect upon the nerves. Almost every one was seized with a shaking just as if they had the palsy, the teeth chattering in their heads to such a degree that they could hardly speak. Even people who did not feel the shock were seized in the same way. They all complained of headache for some time after." Similar manifestations are recorded as having been noticed after the earthquake in London,[3] and that of Yokohama in 1880. Numerous instances of this nervous vomiting, etc., were noticed by Porcher and Guiteras during the epidemic of neurosis which followed the Charleston earthquake in 1885.[4] Porcher

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[1] "Earthquake Effects, Emotional and Moral, *Trans. Seismol. Soc. of Japan*, Yokohama, 1887, vol. xi.

[2] *Phil. Trans.*, London, vol. xliv.

[3] *Ibid.*

[4] *Med. News*, Phila., 1886.

says that "after the earthquake some persons were attacked with nausea, accompanied by vomiting, which recurred or persisted in some cases for days." Mr. S. and Mr. H. also had nausea, accompanied by colic and diarrhœa. Guiteras in his paper already referred to, when writing on the nervous effects produced by the earthquake, says "that the majority of symptoms were evidently hysterical. The functional disturbances may be classified as vertigo, nausea, vomiting, diarrhœa, and frequent micturition." *A propos* of the same subject, Stuart of Beaufort wrote as follows:[1] —"It was curious to note the number of persons, both male and female, particularly female, who suffered from nausea after the earthquake. This I attributed to fear, but many disclaimed any feelings of fear, and yet continued to suffer from the symptoms of nausea. In some cases the nervous symptoms were more serious. In one patient, that of a young lady, hysterical convulsions developed.

2. *Abnormal mental conditions.*—Dr. Porcher of Charleston recorded several cases of severe mental disturbance amongst the numerous list of neurosis which followed the 1885 earthquake. He attributed them to anxiety and prolonged loss of rest. In an article in the *Medical News* he says that two such persons will require to be sent to an asylum, and that another case under his observation had not (at the time of writing) recovered sanity. To Dr. Sturge of Nice I am indebted for some interesting personal reminiscences of the Riviera earthquake in 1887 bearing on this subject. He tells me that in quite a number of cases real nerve-shock was produced, which there can be no doubt in several instances resulted in death. Of equal clinical interest are the cases of what Sturge calls "late nerve shock," "consisting of a state of nervous apprehension, most difficult to deal with, which developed insidiously a month or six weeks after the shock, in people of good nerves, who suffered no fright at the time, and whom one looked upon as quite strong-minded, and out of reach of nervous disturbances of the kind." A similar type of case is described by Porcher, which "occurred in an active, strong, hard-working man, who was not unnerved by the shock, but who had finally to succumb, with his nerves completely shattered." Another observation on the curious mental effect which may be produced by earthquakes is made by Sekiza of Tokio University.[2] He records "that many persons became mad, and many more, though not going so far, became sick, or wasted away their property."

I was interested to receive from Prof. Milne the following advice in connection with this subject: "When treating of nervous effects of earthquakes, you should carefully distinguish between the effect on different nationalities: Europeans are hysterical, especially the women; the Japanese are most distinctly less so." Cases of nervous prostration appear to be met with after earthquakes; *e.g.* Dr. Moore (U.S.A.), in his report to the State Board of Health after the earthquake in 1885, said that it "had undoubtedly produced a very deleterious effect upon feeble persons, being followed by much nervous prostration and other unpleasant symptoms. Even upon well and robust people, their effects have been striking in some instances."

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[1] "Medical Notes," U.S.A.

[2] "Letters on the Great Earthquake in Japan," 1891.

3. *Functional paralysis.*—Functional paralysis appears to be one of the rarer forms of neurosis which may be met with. Dr. Porcher of Charleston records one case, that of a boy whose leg became stiff and contracted after the earthquake.[1] I hear also that numerous cases of spinal troubles, paralysis, etc., were treated in the University Hospital of Tokio after the great earthquake in 1891, but it is not clear whether they were considered organic lesions, or functional. In Dr. Sturge's opinion (from his experience after the Riviera earthquake in 1887), there is a relationship between earthquake shock effects and the so-called "railway spine," the condition being far more due to the mental state produced than to the physical shaking, in his opinion.

EPIDEMIC OUTBREAKS OF OTHER DISEASES FOLLOWING EARTHQUAKES.—1. *Conjunctivitis and keratitis.*—Guiteras records[2] that a severe form of conjunctivitis and keratitis became epidemic after the Charleston earthquake, the inflammation frequently being accompanied with superficial and painful ulceration of the cornea. He attributes this to irritation set up by particles of lime and other débris.

2. *Tetanus and erysipelas.*—After the great earthquake in Japan of 1891, both erysipelas and tetanus were extremely common complications among the injured, in fact, sufficiently so to attract the attention of lay historians of that event. Dutrouleau and Gounet, in their work on the earthquake in Guadeloupe (1843), also remark on the number of cases of tetanus which were observed after that shock.

THE EFFECTS OF VOLCANIC GASES AND VAPOURS.—Apart from fairly numerous instances of death having been caused by inhalation of volcanic gases escaping from fissures in the earth (*e.g.* in Java), I can only find two instances of volcanic gases causing disease. The first is recorded by Daubney in his famous work on "Volcanoes." Describing his tour through the volcanic province of Basilicata in South Italy, he writes *à propos* of the town of Maina, "that since the cutting down of a wood between this town and the mephitic lake, a disease has broken out amongst the inhabitants due to the inhalations of deleterious gases which were now much more noticeable in the town." He then describes the disease as being one of the liver, and characterised clinically by marked pallor of the complexion. Volcanic gases usually consist chiefly of hydrochloric and sulphurous acids and sulphuretted hydrogen. The second instance is recorded by De Corogna in his work on the "Eruption of Santorin."[1] He says that there were many cases of bronchitis and of other troubles, due to irritation of the air passages, which arose from the presence in the air of sulphuretted hydrogen and other irritating gases.

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[1] *Med. News*, Phila.

[2] *Ibid.*

In conclusion, I wish to express my thanks to the following gentlemen, who have personally given me information:—Prof. Milne, Prof. Geikie, Dr. Bertillon (Paris), Dr. Tatham (Superintendent of Statistics, Somerset House), Dr. Sturge (Nice), Dr. Gairdner (Naples), Dr. Michael Foster (San Remo), and Dr. Harris (Teneriffe).

THE MEANS OF ARRESTING ACUTE ENDOCARDITIS.

By RICHARD CATON, M.D., F.R.C.P., *Hon. Physician, Liverpool Royal Infirmary.*

DURING the thirty-four years which I have spent in hospital and private practice, few ailments have seemed to me more important, as affecting the welfare of mankind, than those changes in the endocardium which we so often see in connection with rheumatism. During the period I refer to, the advances made towards a more complete etiology of rheumatism have not been rapid, but to-day strong hopes are arising that its microbial origin will soon be a matter of demonstration, not improbably in the diplococcus described by Dana in America, by Wassermann in Germany, and by Poynton, Paine, and others in England. The general treatment of rheumatism has been greatly advanced through the work of Maclagan and Stricker, but, unfortunately, not much progress has been made in the prevention of those cardiac changes which form the most serious danger of rheumatic disease.

Most physicians have observed, with great dissatisfaction, the results of the merely expectant treatment of incipient cardiac affections, and I personally felt this so much that I began twenty years ago to strive after the discovery of measures of prevention. These at first for some years were disappointing, and I need not waste time by detailing them. Getting a little more light, through these failures, a plan was devised in the year 1885 which has proved more successful. The clinical material to which this method has been applied consisted of about five hundred cases of acute rheumatism.

These cases, in so far as the rheumatism was concerned, were treated much in the ordinary manner. Salicylates, with an occasional cholagogue, were given, with a light diet; the whole body excepting the head was clothed in flannel; the patient was kept strictly in bed for several weeks; any lingering pains were dissipated by the use of small local blisters. Under this treatment the proportion of cases of valvulitis was not great.

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[1] "De l'influence des emanations volcaniques sur les êtres organises, particulierement étudiée à Santorin pendant eruption de 1866."

During the last sixteen years I have met with ninety-two instances of endocardial mischief arising in these cases treated in hospital. Perhaps it would be well to describe the signs which were considered to indicate the presence of commencing valvulitis. First, a change in the character of the first sound at the apex, a softening with loss of clearness, advancing to the development of a murmur, usually systolic at the mitral, but sometimes presystolic.

This was almost always followed by accentuation of the first pulmonary sound. More rarely the disease was indicated by a *bruit* at the aortic cartilage. Not every *bruit* of course was regarded as an indication of organic disease; for example, the slight transitory murmurs sometimes met with were disregarded; also those heard chiefly at the pulmonary valve, accompanied by *bruits* at the clavicle and often by obvious anæmia—these were regarded as being merely hæmic. Lastly, there are a few cases in which a weakened and dilated condition of the ventricles gives rise to a temporary murmur, without there being any real organic disease; in this state of dilatation dulness is somewhat increased, and there is no pulmonary accentuation, but still there is difficulty sometimes in distinguishing these cases from commencing valvulitis.

Those cases in which it appeared probable that endocardial inflammation had commenced, and that the valve was acting imperfectly, the lesion being of only brief duration, were treated by the following method:—

First, Absolute physical rest is enjoined for at least six weeks. The patient is kept in bed with the head low, he is not permitted to raise himself, nor leave his bed for any purpose. Sleep is encouraged, pain and also all mental excitement are avoided, the diet is simple and unstimulating. The object of this complete rest is of course to reduce the demands upon the heart to a minimum, to lessen as far as possible the force and velocity of the blood current, to lessen to some extent the mass and volume of the blood, to diminish the perilous pressure of the blood upon the softened and weakened valve cusps, and to lengthen the only rest time the heart can have, namely, the interval between its systoles. The importance of rest can scarcely be exaggerated. What would happen to the synovial membrane and fibrous tissues of a rheumatic joint if constant rapid movement were maintained during the acute stage? but in the joints the beneficent influence of pain compels rest. No complete rest is possible for the heart, hence probably the fact that rheumatic lesions there do not tend to recovery as they do in the joints.

This first requirement, of rest, is by far the most important part of the triple method which I desire to lay before the reader. Passing on to the *second*, I wish in passing to point out that the salicylates do not achieve so much for the heart as they do for the articulations. They lessen fever and remove pain and swelling in a marvellous manner, but I fear there is no evidence to prove that they prevent or remove endocardial affections. Moreover, the heart tonics, digitalis, strophanthus, caffeine, etc., appear to have an injurious rather than a beneficial effect. Is there any other channel by which we can stimulate the trophic and reparative processes in the heart without impairing vitality or increasing mechanical activity? Can we obtain any hint from measures which influence rheumatism favourably in other organs? I think we can. Long experience has taught me to rely confidently on the effect of small blisters, applied locally, in relieving rheumatism in joints when the salicylates fail. Every one who has given this method a fair trial, I believe, accepts it. The effect is doubtless due to stimulation of vasomotor and trophic nerves in the joint.

If this be admitted, the question next suggests itself—Stimulation of the surface skin being so potent in aiding recovery in a joint, is it not possible that a like therapeutic effect might be produced in the rheumatic heart, if similar stimulation of its related skin areas were practised? It is well known that the first four dorsal nerves are related and co-ordinated in the closest manner with the cardiac nerve mechanism. Although the distance between the thoracic skin and the cardiac nervous centres, *viâ* the afferent neuron, the cord, and the sympathetic ganglia, is greater than that between the skin of a limb and the joint structure beneath it, there is strong probability that impulses would travel readily along so definitely co-ordinated a route as the one in question. Can we through this channel excite the trophic centres of the heart to increased effort in the combat with the poison of rheumatism? To me it seems worth while to make the attempt, especially as by no other avenue can we, so far as I know, hope to influence the nutrition of the heart. In pursuance of this theory, a succession of small blisters is applied to the wall of the chest, between clavicle and nipple; each blister is about the size of a florin, and is followed by a small poultice. If the application is made in the proper manner, scarcely any pain or inconvenience is complained of by the patient, even in the case of children.

Thirdly, In the brief compass of this paper it has been impossible to describe the structural changes which take place in the valve cusps, or the considerable amount of imperfectly organised material which is effused into the substance and upon the surface of the inflamed cusp. If complete restoration is to take place, it is essential that this effused material should be absorbed and removed as soon as possible. It seems, therefore, wise to administer one of those drugs which are believed to absorb effusions and remove thickening in fibrous tissues. Of these, sodium iodide seems the most suitable; it is consequently given. The iodide may also be of service, along with a restricted diet, in lessening the volume of the blood.

In conjunction, therefore, these three methods are employed in every case of endocarditis, namely, absolute rest, stimulation of cardiac trophic centres, and the administration of sodium iodide.

Now a word or two about the results of this treatment, as applied to the ninety-two cases I have referred to. It is needful to divide this series into two groups. The first consists of those instances, sixty-one in number, in which a murmur and other signs of valvulitis existed at the time of the patient's admission to the hospital; the *bruit* was probably recent, but its exact duration was impossible to ascertain. Out of these sixty-one cases forty-one left hospital with apparently sound hearts, while in twenty the signs of valvular disease persisted. Secondly, in thirty-one cases the *bruit* and other signs of valvulitis came on while the patient was in hospital, so that its exact duration was known; of these, twenty-eight left hospital with an apparently sound heart and three with valvular disease.

These results, so far as I am aware, are superior to those obtained if no special treatment be directed to the heart.

In judging of the results, it is desirable to note the patient's condition months or even years after direct treatment has ceased. I have endeavoured to do this as far as is practicable, but with hospital patients it is only possible to a limited extent; so far, however, as I have succeeded in keeping these cases under observation for lengthened periods, the results have been highly satisfactory. But even where this proves impossible, the probabilities of future immunity are much greater when we have watched the gradual subsidence of *bruit* and pulmonary accentuation, and when, after long rest, the patient leaves hospital with sounds both at the apex and at the pulmonary valve absolutely normal, and no embarrassment of breathing on exertion,—much greater than when he returns to his work with a murmur and dyspnœa following all muscular effort.

Three important points remain to be stated—(1) This treatment is of no use unless it be commenced early; if the disease has been manifest for more than two or three weeks, I fear it is of little use. The earlier it is commenced the better is likely to be the result. (2) When apparent recovery has taken place, it is important that the patient refrain from arduous muscular effort, from everything, indeed, that puts strain upon the heart, for some three months. (3) It is highly important that no further attack of acute rheumatism take place; if that disease should recur within some months, the valvular mischief is almost sure to recur also, and then to prove more difficult of removal than in the first attack.

If I might venture to sum up the conclusions which a somewhat lengthy period of observation has led me to entertain, they would take the following form:—(1) If the cardiac complications of acute rheumatism receive no special treatment, and the patient is allowed, when the rheumatism has subsided, to return to his usual course of life, he will, in the great majority of cases, become the subject of organic heart disease. (2) In all cases of acute and subacute rheumatism, and in the obscure cases of rheumatism peculiar to childhood, it is important to keep a close watch upon the heart, so as to detect the onset of valvulitis in the early stage. (3) If the disease be early detected, and is then judiciously treated, in a large proportion of cases organic mischief will be averted.

If success is to be secured, a careful selection of cases is essential, and so also is perseverance in treatment; but every one will admit that no amount of care and trouble are too great, if immunity from valvular disease is to be attained.

PHLYCTENULAR CONJUNCTIVITIS.[1]

By KENNETH SCOTT, M.B., F.R.C.S.ED., *Ophthalmic Surgeon, St. Mary's Children's Hospital, London, E.*

THE peculiar form of inflammation which is called *phlyctenular conjunctivitis*, occurs at any part of the superficies of the globe which is included within the palpebral fornices. It is also seen occasionally, but much more rarely, on the conjunctival lining of the eyelids. The following remarks are particularly directed to the subject of treatment, but a few cursory and more general words are necessary before proceeding to that point.

The affection is essentially one pertaining to childhood and the earlier years of life, and is rarely seen beyond the age of 21 to 25 years. The more recent generic appellation of "lymphatic conjunctivitis" gives the clue to its nature, as it is in reality merely a local manifestation, which is characteristic of the scrofulous diathesis; this is a fact which is important in itself, and frequently does not receive sufficient attention. The etiology of the local phenomenon is amply described in text-books, and the only point demanding insistence is, that the eruption, which assumes the form of a small nodule, either single or multiple, and of varying size, is not a hollow vesicle containing fluid, as in herpes, but is of solid consistence, and is composed of cellular elements; it disappears either by a process of natural reabsorption or by one of disintegration. The latter occurs in the form of ulceration, which commences at the apex, and is followed by healing and subsequent cicatrisation. The local symptoms vary greatly in intensity, depending both on the degree of the eruption and also, more especially, on the site which is involved. The photophobia, lachrymation, and discomfort are greatest when the eruption appears over the corneal tissue, instead of at the limbus corneæ or on the conjunctiva. This is probably due to the exudation including or disturbing the end-filaments of the corneal nerve fibres, and, to a less extent, from the mere presence of the new formation being resented under the eyelids, as if it were an ordinary extraneous foreign body. Eczema of the eyelids and cheek, blepharophimosis and spasm, are merely secondary concomitants arising from the prolonged continuance of the early symptoms.

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[1] Read at a branch meeting of the British Medical Association, held at Sidcup, Kent, on March 7, 1901.

With regard to the question of treatment, emphasis must be laid on the importance of at once seeking means to improve the general condition of the body, both by extra cleanliness when required, the adoption of warm but light clothing, also by the regular administration of extra nourishment, such as malt and similar preparations, counselling rather small doses, and so permitting of more prolonged use without the risk of surfeit. Special attention should at the same time be devoted to the diet. Precautions such as these will more rapidly and surely produce a permanently beneficial effect, than any spasmodic or even continuous introduction of drugs into the body. The latter are by no means to be despised, but should be regarded, in these cases, more as helpful agents than as specific remedies.

In *local* treatment, the classical method which receives very general acceptance is the introduction of an irritant, which is usually some compound of mercury, either in the form of an ointment or a powder; the presumable object of this measure is to encourage the disintegration of the small new formation. This introduction of irritants into an eye which is already inflamed cannot be commended in the first instance as an agreeable process, nor as one which is easy of proper performance in a child, whose natural timidity and resistance are more aggravated than usual by suffering; also the result is decidedly a better one when resolution has been effected by absorption, instead of through a process of removal by ulceration. A more natural method, and perhaps a more rational one also, is to try and alleviate the inflammation which has supervened in the eye, regarding it merely as a local manifestation of the more general bodily condition, rather than as an independent growth which has to be actively eradicated. The course of treatment presently to be described, though not yet widely known, has been subjected to comparison, and has proved as effectual in every way as the classical one, and is distinctly more rapid and satisfactory. No irritants are employed, but every endeavour is made to assuage the degree of acute inflammation already present in the eye. The first essential is that which would be observed in the event of inflammation occurring elsewhere in the body, which is, to establish a condition of complete rest. Atropine in solution is instilled for this purpose, and, by producing mydriasis, wholly prevents the movements of the iris, and also the coincident alterations in the lines of curvature of the cornea. That this is not an unnecessary measure, is revealed by the use of a high magnifying power, when the normal pupil is seen to be in a state of almost perpetual oscillation, varying the size of its aperture in response both to the constant changes in the intensity of the light, as well as to the inward impulses of emotion. The atropine also, to some extent, exercises the antiphlogistic action pertaining to belladonna. It may be suggested that the quiescence of the pupil can be attained by confining the patient to a darkened room. This in reality is not completely effectual, and moreover is a proceeding which is strongly to be condemned, as the prolonged seclusion from light, besides being extremely depressing, interferes greatly with the general nourishment of the body, and therefore impairs the recuperative power. An equivalent amount of protection from light can be obtained by the use of a large and thick shade over the eyes, or by the wearing of tinted glasses.

In the milder cases, further rest and protection are afforded by the application of a dry cotton-wool pad with a bandage, and if a single thickness of muslin smeared with vaselin is placed next the skin, the secretions do not gather and dry on the eyelashes; thus agglutination of the margins of the eyelid is avoided, and also the harmful retention of secretions within the conjunctival sac. The excessive secretion of tears is unimpeded in its escape, and becomes absorbed by the larger cotton-wool pad, whose margin extends beyond that of the muslin.

In more severe cases, additional measures are employed. Hot fomentations, changed at frequent intervals, are applied during one hour, either once or twice in the day. The solution which is found most useful for this purpose is salicylic acid in water, 1 in 200, to which are added, in the form of tincture, small proportions of aconite (2 parts), arnica (4 parts), belladonna (8 parts), and opium (10 parts). Sometimes the last of the fomentations is allowed to cool on the eye, and remain until the next time for repeating it is due, which may be either on that day or the following; at other times it is replaced during the interval with a warm pad of dry cotton-wool. In those cases where the phlyctenule is situated on the surface of the cornea, there is often very great photophobia, but relief is speedily obtained by instilling some cocaine along with the atropine; and, by holding the eyelids apart for some seconds, the solution has time to take effect before it is washed away by the flow of tears.

The skin of the cheek often becomes eczematous in those cases where the lachrymation has been of long continuance, or where there have been relapses of the inflammation occurring at frequent intervals. The application is here indicated of cold starch poultices, the starch having been previously prepared in the ordinary way, but with hot boracic lotion instead of with simple water. The poultices should be continuously applied, and changed, daily or oftener, whenever they cease to be moist. The acutely irritable condition then soon subsides, and allows of more usual remedies being employed.

When there is marked blepharospasm, and more especially when an excoriated fissure has formed on the skin at the outer commissure of the eyelids, relief is afforded by simply dividing the outer canthus. This canthectomy is readily done by the use of a strong pair of blunt-pointed angular scissors. No anæsthetic is required, as the slight operation can be done in a moment, and is not so very painful. The skin having been cleansed, the lower blade of the scissors is gently introduced between the junction of the eyelids towards their outer end; it is then pushed slightly outwards until the point is arrested by the tissues of the conjunctival sulcus, when the blades are firmly brought together. The hæmorrhage, which soon ceases, should not be discouraged, as the local depletion thus produced is markedly beneficial. The spasm of the eyelids is at once relieved, as well as the detrimental pressure which they exert over the inflamed area of the globe. The small wound which has been made soon heals without special attention, and leaves no obvious trace.

If the case is seen at an early stage, the foregoing treatment often causes a rapid recrudescence of the attack, which is always desirable, so as to avoid disintegration by the process of ulceration; when the latter has already begun, the process is hastened and controlled, and is not so apt to invade the true corneal tissue, should that be the site of the phlyctenule. The liability to the occurrence of permanent opacities and irregularities is thus reduced. The small resulting cicatricial marks on the corneæ disappear more quickly, as a rule, in children who are still of tender age; in those who are older, it may be accelerated by regular massage of the globe, made with the finger pressing over the eyelid, the emollient used being of a mildly stimulating nature.

As an essential matter of routine in all these cases, a thorough investigation should be made subsequently, in order to detect, and where necessary correct, any errors of refraction which may be present.

That the question of proper treatment is one of prime importance, and is really worthy of serious attention, is evinced by the not unfrequent occurrence of nebulous opacities and irregularities on the cornea, which are the result of the process of disintegration in phlyctenular inflammation having proceeded too rapidly and too far, so as to cause destruction of the proper corneal tissue. These bad effects often remain permanently through life, and may, and often do, interfere seriously with the material prospects and career of the patient when grown up.

NOTES ON SURGICAL CASES WHICH CAME UNDER MY OBSERVATION DURING THE SOUTH AFRICAN CAMPAIGN.

By D. W. Johnston, M.D., *Surgeon to the Officers' Hospital, Pietermaritzburg.*

(Plates VI. and VII.)

The following notes and observations made during a particularly busy period of the campaign, and which form the basis of my report to the Government, may be of interest.

For the first year of the war I was engaged in organising and managing the Officers' Hospital, under the P.M.O., Lieut.-Colonel P. H. Johnston, C.M.G., R.A.M.C., at the Base Hospital, Pietermaritzburg, Natal, to whom I am indebted for conforming to the ideas and wishes of a civil surgeon, whose methods were occasionally at variance with the fixed routine of the Royal Army Medical Corps.

Passing through my hands were over 700 officers as in and out-patients, and it is from among them I have to draw most of my illustrative cases. Of the in-patients, seven died—three from enteric fever, three from wounds received in action, and one from dysentery.

The wounds which we have had chiefly to deal with have been produced by the Mauser, Lee-Metford, and a variety of sporting rifles, shells, and shrapnel bullets, but more especially by the Mauser rifle. I have not found the statements we have been accustomed to hear, namely, that a soldier may be wounded without knowing he has been hit, or go on until he faints from loss of blood, or till his attention has been drawn to the fact that he is bleeding, borne out by the officers themselves, who have been wounded in this campaign. Instead of this, they describe the effect as like that of a blow from a sledge-hammer, a brick, or a crowbar. In some instances, after being hit through the soft parts, officers have gone on for some time, after recovering from the immediate shock of the blow.

The character of the wounds of entrance and exit vary in accordance with the range, velocity, angle, and the part struck: the bullet going in a straight line at a medium range through the soft parts, the aperture of entrance has the appearance of a small circular bruise, which, if examined carefully, shows inverted ragged edges of skin running across the aperture, which may be raised and placed together so as to fill up the aperture. The exit wound is very little larger than that of entrance, with star-shaped edges of skin which are everted, and which, if the place of exit is hard, as the heel or sole of the foot, are pressed down and form a valvular opening which may be most difficult to find. Those flaps of skin are devitalised, and when kept aseptic become dry black scabs resembling vaccination scabs. If struck at an angle the aperture of entrance may be oval. If the bone is struck, the bullet must necessarily be more or less distorted, and the aperture of exit naturally larger, and there may be more than one exit wound from the fragments of bone being driven through.

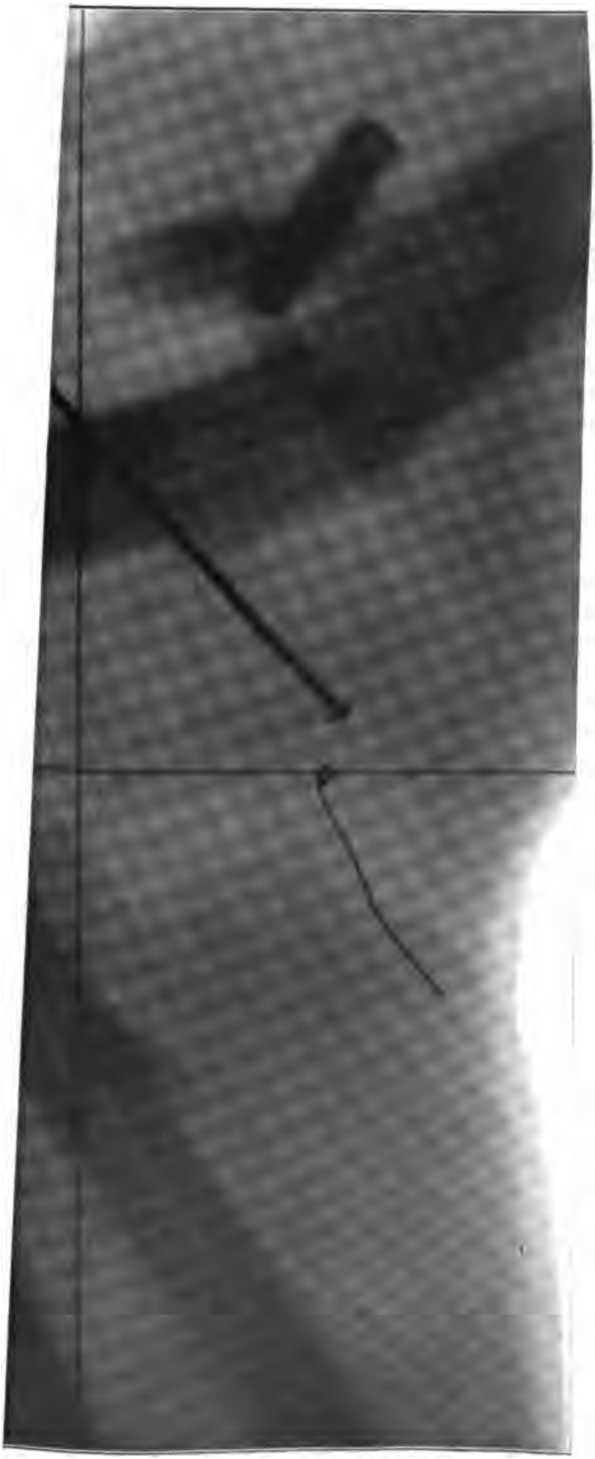
Before this war I had an idea that the drilling effect through the bone of these small bullets would be greater at a short range than at a long. The bullet while at its greatest velocity has a greater explosive effect, and instead of drilling the bone, shatters it into many fragments. The fragmentation is always greater in the shaft of a long bone; the nearer the heads of the bone the greater is the chance of drilling. This coincides with experiments conducted in India on the penetrating power of the Lee-Metford bullet into mud walls, the explanation being that the bullet while at the highest velocity expands, or is distorted in coming in contact with even so soft a substance as mud, whereas at a lower velocity it penetrated without deformation.

A bullet, therefore, which at 400 yards would be more or less distorted, causing great fragmentation of the bone, would probably drill the same bone with very little distortion at 1000 yards. The small bullets do not carry fragments of clothing or equipment, and, unless at very long range, rarely become impacted.

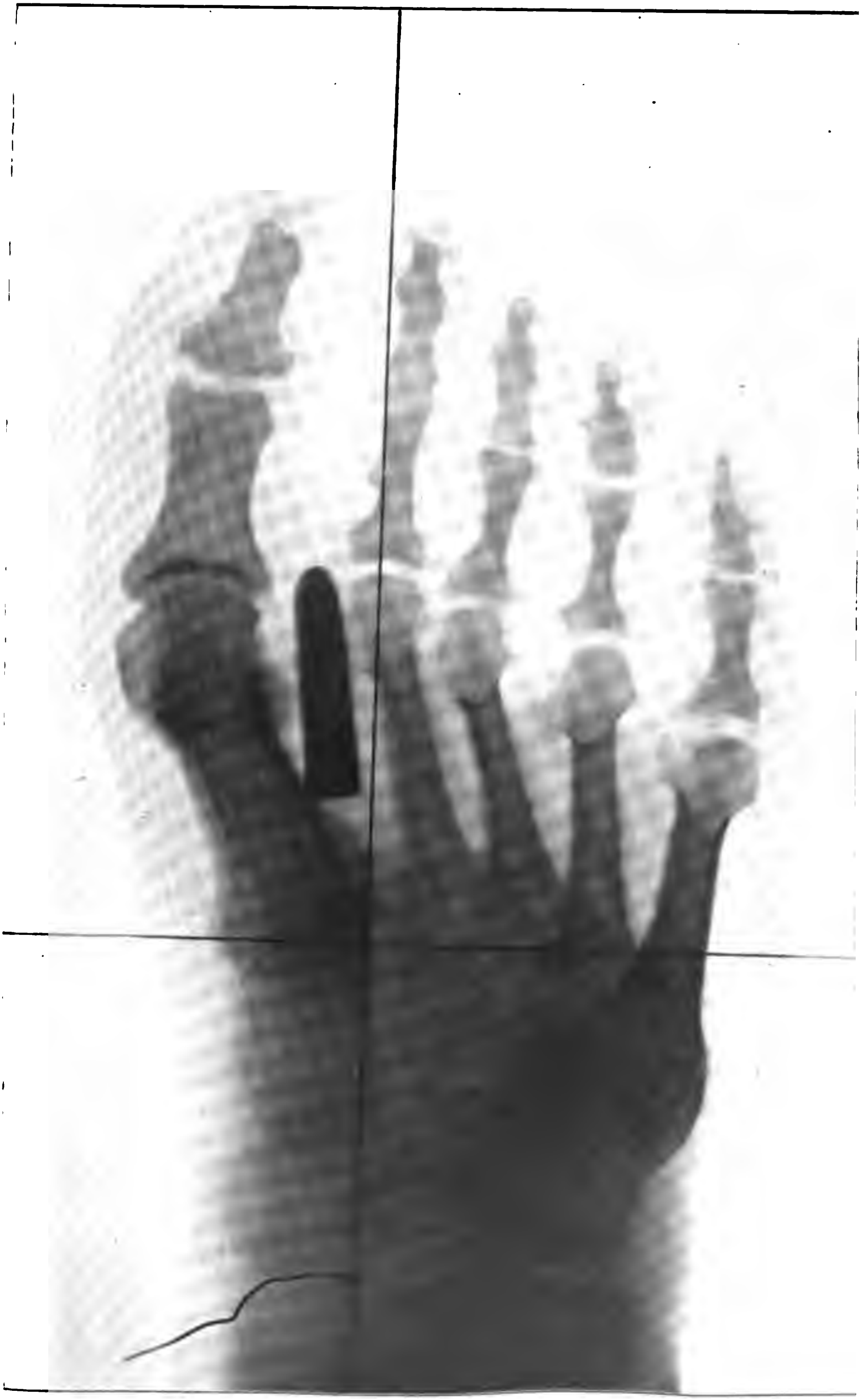
We will consider the general treatment before considering special injuries of different parts.

Injuries from pieces of shell, ricochet bullets, metal casings of bullets, or fragments of stone, require the principle of treatment necessary with the larger bullets, such as the Martini-Henry or Snider. In these, exploration and irrigation are necessary to remove any foreign substance carried into the wound, such as fragments of clothing or accoutrements. Nerves should be secured and vessels tied, and the part put in a position to insure complete rest, by splints or strapping.

Exploration.—Dealing with the bullet of the small-bore firearm, as a general principle I should decry the practice of exploring all wounds, and I should lay down as a principle that none be explored except at a general or base hospital, where all modern antiseptic requirements are at hand. To discover the amount of comminution is an excuse given for exploring recent gunshot wounds. The use of the Röntgen ray does away with the necessity for a great deal of this exploration, and shows the degree of comminution. Skiagrams show that extensive comminution may prevail and excellent results be obtained. If such wounds are explored there might be a temptation to remove the fragments which, if the wound is not interfered with, but kept absolutely pure, are likely to retain their vitality and become reunited. The less the deeper parts are interfered with the better. I should advocate the more frequent use of the Röntgen rays in cases of



ıser fracturing humerus.



Mauser bullet between first and second metatarsal bones.

fracture from gunshot injuries. The character of a fracture and extent of comminution are shown by the Röntgen ray long after the fracture has united and the patient able to use the injured limb. The location of a bullet by the Röntgen ray is sometimes misleading, especially if surrounded by a blood clot.

Exploring instruments.—After extensive experience of gunshot injuries, from 1881 in the native territories of the Transkei, I have found that there is no method or instrument so satisfactory as the use of the forefinger. In the case of shell wounds, or where there are apertures of entrance and exit from the larger missiles, as the Martini-Henry or Snider, or round bullets penetrating the soft parts, irrigation with an enema syringe will, as a rule, do all that is required. The irrigation should be from the entrance wound, as any foreign body being carried in is more likely to be near the exit, and on such wounds free drainage should be established from the exit wound. For this purpose I have found a strip of gauze squeezed out of iodoform emulsion most satisfactory. The enlarging of the entrance or exploring of the entrance wound of the penetrating Mauser or Lee-Metford bullet wounds is much to be deprecated, and in any case, whatever structures are involved, it is not at all advisable, as above stated, to explore, except in a base hospital, where antiseptic conveniences are obtainable.

At the commencement of this campaign it was the exception for a wound to come down from the front in a septic condition. Later on it became the exception for one to come down in an aseptic condition. There may be several factors to account for this. Greater care may have been taken at first; the dressings were all new, as were the tents, and all the hospital impedimenta. The bullets were new and clean, but it is an open question whether a bullet can carry organismal life with it on its course through the air, as there is evidence that the temperature of a bullet is considerably increased, but whether to such an extent as to destroy organismal life is questionable. Certain it is that a bullet may be so increased in temperature sufficiently to scorch and blister the skin.

I have seen cases come from the front with a crusted cake of iodoform with pus underneath; the same applies to small collodion dressings. With the small opening made by a Mauser bullet, a small dry boric dressing cannot be beaten. If possible, it is well first to thoroughly wash the wound with antiseptic lotion, and dust with boric powder, the dressing is applied, and the whole strapped on with rubber plaster or fixed by a bandage.

Extractors.—A long, slightly curved, toothed dressing forceps I have found best. The screw-thread and claw-shaped forceps which were used with the leaden bullet are unsuitable, on account of cupro-nickel casing the present-day bullet, and for the same reason as that advanced by Sir Thomas Longmore: "No forceps depending on sharp points for its grasp can be employed without causing unnecessary hazard to a wounded man whenever the foreign body is not in view, for injury can be so much more readily inflicted by a pointed instrument, and so much more unconsciously to the operator, than can happen with extracting instruments which end in smooth blunted points, when they are properly used."

Extraction.—Where there is no suppurative condition and there is no particular reason for interfering with the bullet, *id est*, from its pressure it is causing no pain or interfering with the functions of a particular organ, the rule should be to leave a Mauser bullet alone. In many instances where the bullet is lodged in the deeper parts, as in front of a vertebra, more harm may be done by the removal than by the presence of the bullet. The desirability for the removal of larger bullets, such as Snider or Martini-Henry, was not so much from the irritation set up by the bullet itself, but on account of the introduction of other foreign bodies carried in by the bullet, and the inflammatory and suppurative condition invariably set up by them.

I shall now deal with special injuries, giving illustrative cases in each.

GUNSHOT INJURIES OF THE HEAD.—In all cases of gunshot injury to the head it is advisable to examine carefully for fracture of the skull. The maxim of Mr. Liston that "wounds of the head of the most trivial character are not to be despised, and the most severe are not to be despaired of," still holds good with regard to injuries of the present day. In all injuries of the head, the less the patient is moved the better. The rules which apply to gunshot wounds in other parts of the body are reversed in the head. Here conservative treatment does not apply. I should lay it down as a maxim that all wounds of the head be thoroughly explored, and if a fracture be discovered, dealt with at once (not to wait for symptoms of compression), by raising or removing any depressed bone, arresting hæmorrhage, and so relieving brain pressure at the earliest moment.

The following case will be sufficient to demonstrate this class of injury:—

CASE 1.—Lieut. H., while retiring, was hit at a range of from 400 to 500 yards by a Mauser, the bullet entering 1¾ in. above the occipital protuberance, in the middle line, penetrating the skull, traversing the brain, and emerging 2¾ in. above the middle of the right superior orbital ridge, 1½ in. from the middle line. When admitted, he was in a semi-comatose state, and could be roused to consciousness. There was paralysis of the right arm and paresis of the left leg, both the pupils were dilated, but more particularly the right one, which was fixed.

Mr. Treves saw him in the train as he passed Chieveley the morning after the accident; he was then suffering from cerebral irritation. All day he was restless and vomited, and the paralysis became more marked until the consciousness disappeared. It soon became evident there was progressive hæmorrhage into the brain, and no time was to be lost in relieving the pressure and arresting the hæmorrhage. He was taken to the operating theatre at 11 P.M., an hour and a half after admission to the Base Hospital, when I made a semilunar incision from the aperture of entrance to that of exit, exposing a fracture of the skull extending the whole distance between the two, caused by the explosive effect of the bullet. There was extensive hæmorrhage through the fracture, about midway between the two. I rapidly trephined over the site of the hæmorrhage, and with Hoffman's gouge forceps clipped the bone in the direction of the hæmorrhage, and found the sinus ruptured, which was plugged with gauze. The apertures were explored and fragments of bone removed. Immediately after trephining the oozing brain-matter which accompanied each pulsation ceased; the patient was given a saline injection into the cellular tissue of the axilla, and of brandy and saline solution into the rectum, and removed to his bed more dead than alive. The wounds healed by first intention, and the patient made a good recovery, leaving this hospital with the cerebration good, and was able to walk a little with assistance, the paralysis of the extremities having quite disappeared.

WOUNDS OF THE FACE.—Where bone has been untouched, these wounds have healed without interruption when produced by a bullet from a small-bore rifle. One of the worst cases coming under my notice during this campaign was that of—

CASE 1.—Captain D., who was wounded on 24th January 1900 at Spion Kop. The wound of entrance was that of an undistorted Mauser bullet, 1 in. from and in a line with the upper edge of the right tragus, over the zygoma, which was perforated, the bullet passing obliquely downward through the hard palate, fracturing the maxillary tuberosity, carrying away the wisdom and last molar teeth. Exit wound embraced practically the whole left cheek, the bullet having expanded and carried fractured bone with it, producing a star-shaped wound embracing the cheek. In such cases decomposition ensues very rapidly, requiring constant care and irrigation, and the removal of all fragments which have lost their vitality. This patient went home with a salivary fistula, with slight paralysis of the face and of the velum pendulum palati.

WOUNDS OF THE NECK.—The great danger here is from wounds of the vessels and of the cervical portion of the cord. An instance where the carotid was injured, producing traumatic aneurysm, was brought to my notice by Professor Watson, with the object of determining the advisability of operative interference. At first the tumour was the size of a small hen's egg. When I saw the case it was not larger than a small pigeon's egg, showing the advisability of conservative treatment in wounds of vessels; this I will show later on.

Demonstrating the injuries to the cord, I have two cases—

CASE 1.—Lieut. B., wounded on 27th February 1900 at Pieters Hill, at a range of about 2500 yards. A normal Mauser bullet wound ¾ in.

to the left of the cervical line, in a line with the lowest point of mastoid eminence, and 1½ in. from the occipital protuberance. Exit wound just above the anterior pillar of the fauces on the right side in the velum palati; the right incisor tooth was broken by the passage of the bullet as it passed out of his mouth. He suffered from hyperæsthesia over the back and top of the left side of the head. He suffered pain in the left side of the head, which increased with noises. He was somewhat deaf in the left ear, and pressure over the mastoid eminence caused giddiness. Here was probably a fracture of the base of the skull. He was transferred to England much improved, and able to walk about, keeping his head fixed.

WOUNDS OF THE CHEST.—A glancing wound of the chest without penetration, may produce the most serious results, as illustrated in the case of—

CASE 1.—Lieut. E. C. P., who was wounded at Hlangwani on the 19th February 1900. He received a severe blow on the chest, but did not feel as though he had been seriously hit, and walked half a mile afterwards. On admission to this hospital he was in the most alarming condition, suffering from hæmathorax and pericarditis; the heart was displaced to the right, and the sounds irregular and indefinite. Over the seventh rib, in the nipple line, was a suppurating linear abrasion about 3 in. long, and a ragged sloughing wound between the sixth and seventh ribs, in the mid-axillary line. He found after he had been hit that the silver corner of his pocket-book and a Mauser cartridge he had in his left breast pocket had been distorted by the bullet in its passage, and they probably deflected the bullet in its course. He was aspirated on four different occasions, and on the 26th March 1900 I resected a portion of the eighth rib, slightly posterior to the axillary line, allowing about two pints of purulent fluid to escape.

The thoracic walls were covered with inspissated mucus. He was twice examined under the Röntgen ray, but no foreign body was discovered.

PENETRATING WOUNDS OF THE CHEST.—Much less damage may be done by penetrating wounds of the chest, as in the following case:—

CASE 1.—Lieut. M. was wounded at Colenso on 15th December 1899, at a range of 1500 yards. When admitted to this hospital there was surgical emphysema of the whole left side of the trunk, extending to the pelvis, and a greater portion of the right chest wall. There was an entrance wound (Mauser bullet) in line with posterior axillary fold 2¾ in. external to it. From the position of the arm at the time of the injury, the bullet escaped the humerus. The bullet traversed the chest through both lungs and could be localised by touch deeply in the right axilla. This officer suffered occasionally from dyspnœa and cough on exertion, for some time after the operation. The emphysema rapidly disappeared, and the patient has been home on sick leave and is now back in South Africa fighting at the front.

The first of these cases shows the necessity for carefully watching all cases of wounds of the chest, although they may be apparently trivial. In this case hamorrhage had been going on for some time, followed by an inflammatory condition, which is likely to supervene in such cases.

Of penetrating wounds of the chest there have been many during the campaign causing comparatively little discomfort. The Mauser bullets, however, prove fatal if penetrating the heart and larger vessels. Where a Mauser bullet is lodged in the substance of the lung and not causing serious discomfort, it is better to leave it alone, and it will do less damage than if sought for by the knife.

ABDOMINAL WOUNDS.—In no class of gunshot injury has surgery been so much changed during the campaign where the bullet of the small-bore rifle has been introduced, as in penetrating gunshot injuries of the abdomen, and in no way is conservative treatment more useful. It is difficult to lay down a rule as to when a laparotomy should be performed. The rule before this campaign seemed to be impressed on every surgeon's mind, that all penetrating wounds of the abdomen should be followed as speedily as possible by a laparotomy. The treatment must depend on symptoms. Unless there are unmistakable signs of serious visceral injury, from experience gained during the campaign, I should advise waiting, and watching the case carefully. I have seen cases of men wounded through the area of the small intestine, get well without operation, and there have been numerous cases where the large intestine has been penetrated without causing any serious symptoms. If the small intestine has been cut, the symptoms are definite, and call for immediate operative interference. Two cases of private soldiers, shot through the area of the small intestine, I was called to see in consultation, got well without operative interference. The first case I was taken to see in the middle of the night. He had been re-admitted to hospital suffering from acute abdominal pains. He had been wounded through the area of the small intestine in the early part of the campaign, and had been discharged for duty. There was no distention of the abdomen and no rise of temperature, or collapse. I diagnosed a rupture of an adhesion, and gave a hypodermic injection of morphia. He was kept in bed a few days, and got well without further symptoms.

CASE 1.—D. M., wounded at Greenhill at a range of about 1500 yards. The bullet grazed the crest of the ilium at the wound of entrance in the left trigone. The exit was 1½ in. from the middle line, and 1½ in. below the umbilicus. When I was called to see this man, about a fortnight after his admission, there was still a good deal of tympanites and pain; considering the time that had elapsed, however, and that the man was not rapidly getting worse, I did not consider it advisable to have recourse to operative interference. He made a slow but steady recovery. In this case the patient had his last food (a biscuit and jam) about 9 A.M., and he was hit about 1 P.M.; this, I think, of great importance. The emptier the stomach and bowel at the time of being shot through the abdomen, the better is the chance of recovery.

One more case of abdominal gunshot injury, where more than one organ was injured, was that of a colonel who was wounded at Colenso on 15th December 1899.

His injuries were: A perforating flesh wound about 1½ in. below the elbow on the radial side, exit at the bend of elbow 1 in. internal to the internal condyle of the humerus. This penetrating flesh wound was presumably caused by the same ball as inflicted the second entrance wound in the body, 2 in. anterior to the mid-axillary line, 1¾ in. above the costal margin (edge of the liver corresponding to the costal margin). A shrapnell ball weighing 169 grs. was removed at Chieveley, 1½ in. above the line of iliac crest and immediately to the right of the third lumbar vertebra, about 1 in. below the level of the entrance wound. The ball in its course passing through the liver, hepatic flexure of the colon, and right kidney. When admitted to the Base Hospital on 16th December 1899, the abdomen was greatly distended and tympanitic, except posteriorly, as high as a line from the anterior superior spinous processes of the ilium, which was dull, due to the extravasation of blood into the peritoneal cavity. He was suffering great pain, and there was severe hæmaturia. I thought I should have immediately to perform a laparotomy, presuming the hæmorrhage into the abdominal cavity to be progressive. I found, however, that a couple of hours after a hypodermic injection of morphia the line of dulness was not higher, and that he was feeling more comfortable. I therefore determined to wait and adopt the expectant treatment. During the day following, although the symptoms were alarming, the dulness did not increase. A quantity of blood passed from the bowel, and the hæmaturia continued; no flatus passed. The distension and consequent dyspnœa continued, and the day following, 18th December, I gave him a small turpentine enema, which was returned with blood, but no flatus or fæces. In the evening I passed a rectal tube, through which a little flatus passed. I treated him with hypodermic injections of morphia and strychnia, and enemata of quinine, whisky and water regularly, which, together with the passing of the rectal tube, had beneficial results. The hæmaturia continued until about 5th January 1900. The wounds healed without much trouble, but not by first intention, and he continued to improve until about the 22nd January, when the temperature again became irregular and the patient restless. On the 24th January there was a tenderness midway between the entrance wound and the epigastrium. On the 26th January he had a rigor at 11 P.M., and on the 28th he began to cough a great deal, with distressing dyspnœa. I put in an exploring needle between the eighth and ninth ribs, and withdrew 1 oz. of pus, characteristic of an hepatic abscess. About two hours later I put him on the operating table and resected about 2 in. of the ninth rib, the incision being from the mid-axillary line, and extending posteriorly. I evacuated a large diaphragmatic empyema. There was a round smooth-edged opening in the diaphragm large enough to admit the middle finger. It is probable that the diaphragm was injured during the passage of the ball, hence the free communication with the pleural cavity. He now made an uninterrupted recovery, and was discharged from this hospital on the 26th February 1900.

WOUNDS OF THE BLADDER.—The only case of rupture of the bladder I have had under my care has been by a fragment of shell. There was a good deal of infiltration into the surrounding cellular tissue. The wound closed by granulation, a catheter being fixed in the bladder, with a rubber tube leading into a bottle of boric lotion, until the anterior wound was closed. I have seen several Mauser bullet wounds in the middle line just above the pubes, but whether the bladder was penetrated or not, I cannot tell. No serious symptoms or signs of rupture followed.

WOUNDS OF THE GENERATIVE ORGANS.—Of these I have had two cases:—

CASE 1. Capt. S., wounded at Monte Christe on the 18th February 1900. The scrotum was penetrated twice and the base of the penis furrowed. There was a considerable hæmatoma in the scrotum. The blood clot I removed in a few days, washing out the cavity, and the wound healed without difficulty.

CASE 2. P. T., wounded at Colenso. The bullet, a normal Mauser, passed through lower part of right testicle and lodged in adductor magnus muscle. The epididymis escaped. There was less bleeding than in the preceding case, and the wound healed up with little damage. A little cicatricial hardening of the lower part of the testicle was the only evil remaining, and this gave no pain.

Gunshot wounds of these parts are treated on ordinary surgical principles as wounds from other causes. The danger is from hæmorrhage.

WOUNDS OF THE RECTUM:—

CASE 1.—Capt. W. S., wounded at Spion Kop, 24th January 1900, at a range of about 400 yards. Entrance wound, that of an undistorted Mauser bullet, ½ in. below the head of the right great trochanter and 1 in. behind it. Exit wound ¾ in. below the left great trochanter, and over the outer margin, grooving the bone. The bullet, in its passage, cut through the posterior wall of the rectum, about 1 in. above the anal ring. I washed out the bowel frequently with warm boric lotion, and the bowel healed without perceptible constriction.

The complications likely to arise in these cases are constriction and pelvic cellulitis and deep suppuration. In common with all extreme irritation of the lower bowel, there is liability to retention of urine, as there was for a time in the above case.

WOUNDS OF THE EXTREMITIES. — The danger to life from wounds of the extremities by the Mauser bullet are reduced to a minimum. Unless the bullet has divided the vessels so as to cut off the blood supply, amputation is rarely required.

I have pointed out that the fragmentation of the bones is greater at a short than at a long range.

The majority of fractures of the long bones I have seen may be termed buttress fractures (Plate VI.). There is the same danger of the callus implicating the nerves in badly comminuted fractures from gunshot injuries as in civil practice from any other cause. I have not had occasion to amputate a limb as a result of injury from a Mauser bullet, and there have been very few such amputations during the campaign.

Wounds through the elbow and knee joints have been numerous. The majority healed with a recovery of complete mobility of the injured joint. I may here point out that all the Mauser bullets I have removed have been pointing in the direction from which they have hit the patient, *i.e.* they have turned, and the point of the bullet is directed towards the aperture of entrance (Plate VII.).

Case 1.—Lieut. R. M., wounded at Pieters Hill on 27th February 1900. He was admitted to the Base Hospital on 2nd March, the following being the note of his case on the transfer certificate:—"For further treatment—Compound fracture of shaft of (right) femur. On day of admission he was anæsthetised. Wound on front of thigh slightly enlarged and explored; could not reach site of fracture through it, nor was any foreign body or loose bone extracted; ruptured rectus femoris muscle and fascia sewn up with silver *wire*, interrupted stitches, about six in number. There is also a ragged wound at back of leg in its lower fourth, dressed antiseptically, graze on inner side of left ankle. Since admission patient has had what appears to be continuous fever, probably due to previous exposure, as he states his fracture does not cause him any pain to speak of. Temperature has varied from 100° to 102°·6, which latter is his temperature at 7 A.M., 2/3/1900. Bowels confined for past two days. Purgative given yesterday morning has not yet operated. He had quinine and antipyrine. Last night, morphia hypodermic, $\frac{1}{6}$ gr."

The injuries of this officer, given in the order in which they were inflicted, were—(1) Gunshot linear grooved wound of left ankle, extending for about 3 in. from the inner aspect of the foot backwards and upwards, grooving the tibia $\frac{1}{2}$ in. above the internal malleolus. (2) Penetrating bullet wound through the lower fourth of right leg, fracturing the tibia, aperture of entrance about 2 in. above the ankle joint on the fibular margin of the tibia. Exit wound in line posterior to the entrance wound, over the tendo Achillis. The apertures of entrance and exit were slightly larger than the normal Mauser bullet wounds. (3) Gunshot entrance wound on outer aspect of right thigh, about the top of the lower third, with two exit wounds on the inner aspect, one about 2½ in. from the pubes, and the other corresponding to the aperture of entrance. The bullet in its course fractured the femur. On examining the thigh the day after he was admitted to the Base Hospital, I found the leg acutely inflamed. An incised wound embraced the whole of the middle third of the outer aspect of the thigh, which was bulging.

I removed the stitches, and evacuated a quantity of pus which had practically burrowed the whole length of the femur. The stitches (silver and silk) I removed from the muscle. The inflammatory condition soon spread over the whole of the extremity, buttock, and lower part of body. Acute osteo-myelitis now supervened, and on the 11th of March I removed two fragments of dead bone, drained freely, and suspended the leg in a Hodgen's splint. He ran a severe course of septic fever, but by free drainage from the dependent parts, and frequent irrigation, he recovered. The fracture of the tibia was a serious drawback in the treatment of the case, preventing, as it did, satisfactory extension. In this case the evil effects of an early exploration and interference, especially from aperture of entrance, are fully demonstrated. A skiagram which was taken showed the presence of a distorted Mauser bullet under the gracilis muscle, 3 in. from the pubes, the only part of the thigh that did not suppurate, demonstrating that looking for a bullet or foreign bodies may do infinitely greater harm than leaving them at rest. The patient was transferred to England with very firm union of the bone. There was some bulging out of the femur and shortening of the leg.

INJURIES TO JOINTS.—In wounds of the joints the merciful character of the Mauser bullet is fully demonstrated. The small valvular-like apertures of entrance and exit, preventing the entrance of air into the joints, and the cleanliness of the bullet, are accountable for the preservation of so many limbs. Where the capsule of joints has been penetrated by fragments of shell or shrapnel, then the question of immediate amputation would have to be considered. None of these cases, however, came under my care.

Where a Mauser bullet has passed through a joint, early passive movement must be enforced. On this depends the extent of permanent mobility of the joint. The following case will suffice to show that joints may be penetrated by a Mauser bullet with a minimum amount of permanent injury.

CASE 1.—Major G., wounded at Colenso on the 15th December 1899. Range about 1000 yards. Normal Mauser entrance wound, 3 in. above and 1 in. to the left of right patella. The knee being flexed at the time of injury, and the direction of the bullet being from above and to the left, the bullet passed obliquely from above downwards through the joint. The exit wound being 1½ in. below, and slightly to the right of, the middle line of the patella. Passive movement was commenced at the end of the first week, but the patient was not allowed to bear any weight on the leg for six weeks. The wound healed without trouble. The patient was sent to England to recruit. He is now back to his regiment in the campaign, and walks without perceptible limp (see diagram, Plate VI.).

An instance showing the increased heat of a bullet:—

CASE 2.—Corporal O., wounded at Colenso on the 15th December 1899, at a range of from 1000 to 1500 yards. Normal Mauser bullet wound of entrance, about 1½ in. below internal tuberosity of left tibia.

Exit about 2½ in. below the head of the fibula, which could be felt notched on its posterior border, the bullet in its course apparently drilling the head of the tibia. An inch below the exit wound was a blister, corresponding to the shape and size of a Mauser bullet, and against which the bullet was lying, supported by the puttie. I regret I did not get a photograph or skiagram of this case.

It cannot be argued that this blistering was due to friction, as the patient did not use his leg between the time of being wounded and the wounds being dressed.

Whether the bullet gets its greatest heat from its passage through the barrel of the rifle or from the friction passing through the air, or from both, I cannot say. Probably it receives its initial heat from the barrel, which is increased by the friction through the air. The impact against any hard substance such as bone, will also give additional heat. The "puttie" unfortunately was destroyed, without being examined for scorching.

There is one more observation I have to make, and that is on the extreme value of a timely hypodermic injection of morphia, on the field if possible, and before the removal of the patient, in all cases of bad gunshot injury. It makes the removal more bearable and lessens the shock considerably, thus possibly in many instances prolonging, if not saving, life.

CLINICAL RECORDS.

INTRAPERITONEAL RUPTURE OF OVARIAN CYSTS.

By KEDARNATH DAS, M.D., *Lecturer on Midwifery and Gynæcology, Campbell Medical School, Calcutta.*

THE following case came under my observation, soon after Dr. Haultain's paper on the above subject before the Edinburgh Obstetrical Society, and I take an early opportunity of recording it.

Kuri, æt. 32, a Bengali woman of rather short stature, was admitted to the Campbell Hospital, Calcutta, on the 22nd February 1901, with a large abdominal swelling. Eighteen months ago she noticed, for the first time, that her abdomen was enlarging, and in two months had become enormously distended. She placed herself under Kabiraji treatment, and was said to have been cured by medicine only. Three months later the abdomen began to enlarge again, and in six weeks was greatly distended. This time, too, she was said to have been cured by medicinal treatment. She stated that, under the above treatment, she was freely purged on both occasions. About four months afterwards, her abdomen began to grow bigger for the third time, but on this occasion Kabiraji treatment did her no good, and she was admitted to the Campbell Hospital on 17th September 1900, when the following conditions were noted:—Abdomen very tense and shining. Distension irregular, there being a shallow depression a little above umbilicus. Measurements:—Around umbilicus, 37¼ in.; 2 in. below umbilicus, 36¾ in.; 3 in. above umbilicus, 38 in.; ensiform cartilage to umbilicus, 10 in.; umbilicus to pubes, 8 in.; R. and L., A.S.S. to umbilicus, 9 in. Dulness all over abdomen; œdema of abdominal parietes. V.E. revealed nothing in the pelvis. General condition fair. No albumin in urine. 2-para. Amenorrhœa for four years.

It was apparent from physical examination that the fluid in the abdomen was encysted, and not free in the peritoneal cavity, but the history of two previous cures by medicinal treatment made me dubious about the diagnosis. An exploratory cœliotomy was proposed, to which she would not give her consent. On the afternoon of the 19th her temperature went up to 102° F., with vomiting of bile-stained fluid (only once). Next morning the temperature came down to 98°·4 F., but in the evening it went up to 104° F. The temperature did not rise any more, but during the next three days she felt great uneasiness, with insomnia, but no actual pain or much tenderness in the abdomen. Bowels were kept open by salines. On the 24th the abdomen was found to be "distinctly less distended." On October 7, 1900, her abdomen was almost flat and tympanitic all over, except the lower part. Patient went home relieved, but came back again on February 22, 1901, with enormous distension of abdomen, about 4½ months after her discharge from the hospital. Her condition now was almost the same as noted on the last occasion (*i.e.* on September 17, 1900). She, however, consented to an operation this time, and after a few days' rest and attention to bowels, abdominal cœliotomy was performed on March 3, 1901. The cyst wall was adherent to the parietes, but the cyst could be easily identified and separated by a sweep of the finger around the incision, breaking the adhesions. After the fluid was evacuated, the collapsed cyst could not be drawn out through the wound, owing to almost universal adhesions of the cyst wall to the parietes. The whole hand had to be introduced to break these adhesions, which were soft. No intestinal or omental adhesions. The fluid evacuated was gelatinous (like white of egg), but it flowed pretty freely through the large-sized Tait's trocar. It measured 280 oz. There were many small secondary cysts. Recovery uninterrupted.

It is evident from the history that the cyst ruptured thrice within a period of eighteen months, with subsequent absorption of the fluid on each occasion. The third rupture took place while she was in hospital, and the clinical features of the process could be carefully noted.

The subsequent peritoneal irritation lasted for two days, after which absorption of the fluid commenced.

On the 24th, absorption so far proceeded that there was a distinct diminution in the size of the abdomen. In the course of the next twelve days almost the whole of the fluid was absorbed (*i.e.* about 280 oz. in fifteen days). The absence of any local symptoms, evidently due to the innocuousness of the cyst contents, is worthy of note. The cause of the rupture appeared to be secondary softening of the cyst wall.

REPORT OF A CASE OF INTERMENSTRUAL DYSMENORRHŒA.

By ANNE MERCER WATSON, L.R.C.P. & S.Ed., *Aberdeen.*

IN view of the interest connected with, and the comparatively small amount of literature on the subject of intermenstrual dysmenorrhœa, or *Mittelschmerz*, it may be of interest to report a well-marked case.

CASE. — The patient, H. B., a married woman, æt. 36, was first seen early in spring. She complained of pains in the back, and was very anæmic and nervous, so much so that she herself said she was inclined to cry at every little worry, and was so irritable she hardly liked to be with her own children. She has been married for twelve years, and has three children—all alive, the youngest æt. 5. She has had no miscarriages. Her first two labours were difficult, and she says she was "badly torn" in consequence. The history of intermenstrual pain dates from shortly after the birth of the last child, at the same time that her general health began to be affected. Menstruation is always regular and painless—the amount lost is not excessive, and has not varied much since the flow began, when she was æt. 18½. The *Mittelschmerz* begins fourteen days after the preceding period, though rarely its onset is on the thirteenth day. It lasts for three days, and she practically never escapes. The spasms are like ordinary dysmenorrhœa, but there is no discharge of blood or other fluid. She is not confined to bed, but lies down during these three days at intervals. Constipated as a rule, she is worse at these times, and is also much troubled with pain and frequency of micturition.

On examination, the external genitals and vagina are normal, but there is considerable leucorrhœa. The cervix feels large and indurated and mushroom-like in shape, with enlarged Nabothian follicles, most marked on the posterior lip. On both lips is a large area with a "velvety feel." The cervix is transversely fissured, and the posterior lip feels hard and shotty. The fornices are free; the uterus is normal in size and freely movable, and lies rather more to the right side than normal. As seen by the speculum, the discharge issues from the external os, and is white and glairy. The cervix is large and much fissured, both lips are everted, and show large patches of granular erosions, and several follicles the size of sago grains. The urine is normal, and locally there is nothing to cause the alleged frequency of pain on micturition. Patient's general condition of nervousness seems sufficient to account for these symptoms, as they have much diminished under treatment by general tonics and regulation of diet and bowels. For a short time she suffered from a dry eczema, affecting the hands, ears, and chin. This disappeared with the use of oatmeal instead of soap, and the local application of resinol ointment.

The cervical condition was cured after four weeks' use of hot vaginal douches, ichthyol plugs, and 10 per cent. ichthyol in glycerin, applied to the erosions of cervical canal by means of Playfair's probe.

One patch remained obdurate, and was touched with carbolic acid, 1 in 7, with satisfactory results; and for the first time for five years the patient passed four weeks without pain of any kind.

This case appears to belong to the first division in Halliday Croom's classification,[1] as it is one with "pain, but with no external manifestation" in the way of discharge, and, according to him, is due to ovulation and menstruation not being simultaneous, the pain being occasioned by the rupture of a Graafian follicle through a thickened ovarian capsule.

In reviewing the scanty literature on the subject, it seems evident that, in almost every case, some local lesion has been present, though there has been no constant pathological condition. Thickened and dilated tubes, anteflexed and retroflexed uteri, conical cervix with pin-hole os, chronic endometritis with lesions of the os, ovarian tumours, and ovarian thickening—all have been found in different cases.

In no reported case does *Mittelschmerz* seem to have been congenital; in all it has been acquired, and in most the patients have been married women. One case quoted by Croom,[2] dated the onset from an attack of scarlet fever; but whether this was the real onset, or merely an incident from which the illness was dated, is not noted. A considerable number of women seem to suffer from this trouble, but in such a mild degree that they pay no attention to it, until their general health deteriorates through some intercurrent disorder, and the nervous element begins to gain the upper hand.

It is said that this form of dysmenorrhœa is generally in relation to the subsequent, rather than to the antecedent, period, but in my case this is clearly not so.

The case seems to me of interest as confirming the general view, that in most of these cases there is a local lesion, and that the nervous element is an important factor. It also raises the question: If *Mittelschmerz* be caused by the want of simultaneity between ovulation and menstruation, why is the condition always acquired, and what has occurred to disturb what we must otherwise consider to be the normal rhythm?

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[1] *Edin. Med. Journ.*, 1896, vol. i. p. 703.
[2] Priestley, *Brit. Med. Journ.*, London, 1872, vol. ii. p. 431.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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I. *A Civilian War Hospital.* By the PROFESSIONAL STAFF. London: John Murray.

II. *Surgical Experiences in South Africa,* 1899–1900. By G. H. MAKINS, C.B., F.R.C.S. London: Smith, Elder, & Co.

WHAT may be called British Military Medicine has not of late years occupied a prominent position in literature. For full information on the subject recourse to American and German works was essential, and the histories of the War of the Rebellion and the Franco-Prussian struggle furnished us with our main facts regarding military surgery. This was but natural, for Britain's little wars offered only a small scope in such a direction; but the reproach—if reproach it is—will shortly be most effectually wiped out. If the official report in any way resembles its forerunners, it will not be lacking in interest and instruction, for these two books, hailing from civilian pens, are alike absorbing and educative.

"A Civilian War Hospital" is an account of the work of the Portland Hospital, and of experience of wounds and sickness in South Africa, and it constitutes a goodly volume, in two senses.

It opens with a section on personnel, equipment, and interior economy, by Surgeon-Colonel Kilkelly, the P.M.O.; and any one who has had an opportunity of witnessing that officer's tact and organising powers will expect an excellent treatise on the subject. Nor will he be disappointed, though in the nature of things a detailed consideration of such matters does not form very entertaining reading. Colonel Kilkelly, however, gives forth no uncertain sound regarding the value of typhoid inoculation, and is to be found cavilling at the red tape which hampers and restricts the Army Medical Department.

A general sketch of the career and work of the Hospital is contributed by Mr. Bowlby, its senior surgeon, whose remarks are specially interesting to any one who has served in South Africa. He discusses many things, from the usefulness of Indian tongas to the X-ray equipment employed, and pays a well-deserved tribute to the orderlies of the St. John's Ambulance Corps. He reviews the general question of civilian war hospitals, and points out, what is very true, that a skilled pathologist should form one of the staff. His opinion that there is no satisfactory form of ambulance waggon will be endorsed by most surgeons who have served at the front, while his account of tents, dressings, etc., is likely to prove useful, if the necessity for such hospitals should ever again arise.

Drs. Tooth and Calverley write the section devoted to medicine, and their review of the enteric outbreak at Bloemfontein is alike sound and suggestive. They give due prominence to flies as means of conveyance of the virus, and point out how those pests were wont to settle on the enteric patients. Indeed, it might be well said that where typhoid is, there shall the flies be gathered together. They discuss the question of symbiosis in the light of Sanarelli's experiments, and regard it as both possible and probable that the *Bacillus coli* was an important factor in the etiology of the fever. Their statistics relating to enteric fever and inoculation are distinctly in favour of the latter as a means of prevention, and of lessening the severity of the disease, and their "strong impression is, that the manner in which a person reacts to inoculation is some indication of his degree of natural immunity." Many important points are touched upon in reference to the symptoms and treatment of the dreaded scourge. They adopted a somewhat bold method of feeding, and found no reason to regret it, but they are careful to point out its limitations. The more common forms of intestinal antiseptics they describe as useless, but state that they obtained good results from a mixture containing chlorate of potash and bicarbonate of soda, thereby possibly paying a tribute to the value of chlorine. Simple continued fever does not escape their notice, and they recognise it as a distinct form, though they deprecate the use of the term. Their definition of South African dysentery as "diarrhœa writ large" is apt, and in all probability correct. In this connection it is interesting to note that they regard the ill effects of swallowing dust as probably due to its infective character, while the surgeons speak of its innocuous nature in the case of wounds. There is, however, doubtless a great difference between a sensitive and perhaps inflamed mucous membrane, and a skin abrasion or the walls of a bullet track. Two remarkably fine photographs illustrate the dysenteric condition, for which they strongly advocate the saline treatment, thereby agreeing with the general consensus of opinion.

Mr. Bowlby and Mr. Cuthbert Wallace are responsible for the main part of the work which relates to surgery, opening with short accounts of weapons and projectiles, and the surgical aspect of modern rifle fire. Space does not permit of detailed mention of their work, and the conclusions drawn therefrom, which amply repay careful perusal. With regard to fractures, they think the scope of conservative surgery is practically unlimited, if the patient be placed under favourable conditions—a comforting outlook in the case of a European war.

They note that our knowledge of bullet wounds of bone, thanks to the extensive use of the X-rays, has been placed upon a firm basis, and that several pre-existing ideas have been controverted by actual experience. Dr. Weir Mitchell's description of the severe pain accompanying gunshot wounds of nerves does not seem to have applied to the cases treated in the Portland Hospital, where, on the whole, they had most successful results with their surgical patients, many of whose cases are quoted at some length. A brief chapter on miscellaneous surgical work concludes the article, which is exhaustive, and yet concise and practical. Useful appendices are given, and so complete is the volume, that one ranges from the tables of water analyses by Dr. Tooth to the menu of the viands under which the mess table groaned on the Queen's Birthday. It would appear that the lot of the Portland Hospital, the pioneer of its class, was a peculiarly happy one, due largely to the exertions of an able staff, and their friendly relations with the powers that were; and it only remains to add that this finely illustrated account of its origin, progress, and work forms a fitting conclusion to what may be described as a great philanthropic and patriotic enterprise.

The second book is at once more ambitious and important. Indeed, it would seem probable that Mr. Makins' work will remain the standard treatise on modern bullet wounds, and with good reason. For one thing he had an almost unique experience, both in general and field hospitals, attending the wounded after the earlier battles on the eastern side, and accompanying Lord Roberts' army on the march to Pretoria, while he had also a glimpse of Natal. For another, the author has made the most of his opportunities. Indeed, any one acquainted with the climate and the conditions at the front must be possessed of feelings of surprise and admiration on closing this book—surprise that such a vast amount of valuable material could be garnered in the short space of nine months, and admiration of the energy, enthusiasm, and tenacity of purpose which rendered its collection possible, and of the able and philosophic manner in which it has been recorded.

Mr. Makins was not content to take careful notes of cases under trying conditions, but has kept in touch with many of the patients who had the advantage of his surgical skill, and so has rendered his account full and complete in many instances.

It is interesting to read a surgeon's opinion on enteric, and Mr. Makins is probably not far wrong in ascribing the gravity of many of the cases he witnessed to a septicæmic infection, there being absorption from the foul material coating the patients' mouths and tongues. He treats at some length of hospitals, transport, and general surgical mortality, and then enters upon a careful discussion of bullets, with regard to type, velocity, trajectory, and revolution. General remarks on bullet wounds and wound symptoms follow, with a consideration of ricochet and of expanding bullets, leading up to questions of prognosis and treatment, and so paving the way for an exhaustive consideration of the regional surgery of bullet wounds.

The author notes the disadvantage of the kilt, as affording a material frequently carried into wounds and producing suppuration. Sepsis seems to have been more common in his experience than was perhaps generally supposed, but it was not, as a rule, of a severe nature.

In the part dealing with special injuries, an occasional narrative gives point, and is welcomed, for the very minuteness of Mr. Makins' observations at times makes the reading a little heavy though none the less valuable.

Perhaps the special feature of the book is its article on bone injuries, illustrated as it is by a remarkably good series of X-ray photographs.

Surgeons will read with interest of the ingenious contrivance, in vogue at Orange River, to obtain extension in the case of fractures of the femur, and perhaps be surprised that not a single case of joint excision falls to be recorded.

Throughout, Mr. Makins has much to say in the way of comparing the effects produced by the old and the modern bullets, and brings forward much that is apparently new. Fractures of the vertebræ are taken up along with spinal injuries, and those of the ribs with lung wounds, a useful arrangement, whilst the list of rules for treating hæmothorax, which was generally the result of damage to the chest wall, will appeal to many who have had to treat this awkward complication.

Mr. Makins modestly describes his remarks on wounds of the abdomen as most unsatisfactory. In one sense this may be the case, but he has done something to lessen the difficulties of a troublesome and complicated subject, and his conclusions as regards treatment strike one as likely to aid the novice. The tendency of intestinal bullet wounds to be near the mesenteric border is duly noted and commented upon, while a special theory is advanced to account for the miraculous recoveries, which, after all, were none too frequent.

But little space is given to shell wounds, which we are informed always suppurated, with the exception of clean tracks produced by leaden shrapnel.

A word of praise must be reserved for the numerous and, in some instances, remarkable illustrations, which, let it suffice to say, are worthy of their setting. ANDREW BALFOUR.

Anæsthetics and their Administration. By F. W. HEWITT, M.A., M.D. London: Macmillan & Company, Ltd.

IT is significant of the increased attention which is being paid to the subject of anæsthesia, that during the first six months of the new century no less than four publications of some pretension have appeared on this subject.

We have no hesitation in saying that in permanent value the above work ranks far and away above its predecessors, and may be fairly considered the most authoritative and elaborate treatise on this branch of medicine in the English or indeed any other language. The present edition has been considerably enlarged and embellished. Much of the former edition remains unaltered, except in minor details. The author's views in regard to chloroform seem to have undergone some slight modifications since the first edition appeared, and on increased experience he seems to use it alone, or in combination, to a somewhat greater extent than formerly. He is still most emphatic in strongly condemning its employment in dental surgery, as subjecting the patient to a most unnecessary risk; and with his views we heartily concur.

The question of the exact mode of death occurring early in chloroform anæsthesia is discussed in an interesting and exhaustive manner, and the author appears to think that the theory of "reflex cardiac inhibition" causing death during light anæsthesia, merits similar usage to that of "fracture by contre-coup," namely, respectable burial! His opinion is based largely on the experiments of Dr. Leonard Hill. He considers the "psychical element" most important in these cases.

Although Leonard Hill has proved cardiac inhibition not to be fatal on animals unless prolonged, it is quite impossible to demonstrate the exact relation of the vagus nerve to these cases clinically, and the fact remains that such deaths, in light chloroform anæsthesia, do occur commonly, increasing an already appalling total. There is evidently a subtle entity to be reckoned with in dealing with humanity not dreamt of in the philosophy of laboratory experiment.

The most important, and certainly the most interesting addition to the work, is the chapter on physiology of anæsthesia.

The book is written by a specialist and enthusiast, and to a considerable extent must interest specialists in anæsthetics alone, or those who devote much time and attention to this subject. The chapter on "Sequences" is instructive, but we can hardly imagine the general practitioner for greater safety taking with his "impediments" a Skinner's mask, a Rendal's mask, and an Ormsby's inhaler, all for use in one case, as described on p. 416.

We think all that can be reasonably expected of the most "up-to-date" practitioner is to carry in his anæsthetic bag some lint, a Clover's inhaler, chloroform, ether, and a tongue forceps.

As a whole the book is one of outstanding merit, evidently the result of the most painstaking care and many years' daily observation of the various anæsthesias.

Anæsthetics are only too often given by rule of thumb; Dr. Hewitt has reduced their administration to a science.

THOMAS D. LUKE.

Therapeutic Electricity and Practical Muscle Testing. By W. S. HEDLEY, M.D. London: J. & A. Churchill.

WE have read this work with much interest and pleasure. Dr. Hedley strikes an original note, and his book will be found refreshing reading. In no sense can it be called, like too many books on this subject, a collection made from instrument makers' catalogues, with short descriptions.

An endeavour is made in the introduction to give some insight into the part played by the ether in electrical phenomena. This is perhaps rather too difficult for the busy practitioner, who may well omit it. We regard the analogy between the flow of an electric current in a wire and the flow of a fluid in a tube as very close and not misleading. We think that this description is to be preferred to Dr. Hedley's remark that there is an imperfect analogy. In the description of primary cells, while the usefulness of the Leclanché is referred to, its construction, mode of action, and maintenance are not sufficiently dwelt upon.

On p. 20 we notice the statement, that when a current encounters resistance, as for example in passing along a thin wire, the wire is heated in proportion to the strength of the current. This might be misleading, for the heating effect is proportional to the square of the current strength. It would be better to avoid the term "intensity" altogether. Current strength is the best term. After an interesting chapter on magnetism and the induction coil, some account is given of static electricity and of high frequency currents. We have not, however, found it necessary to place the spark gap of the condenser in a blast of air or in a magnetic field; it is an improvement, but it is far from essential. Chapter viii., on current from the main, is an excellent one, and might well be extended by such an authority on this subject. A good deal of space is devoted to the important subject of electro-diagnosis; and reference is made to reviewer's researches on the resistance of the urine, but the characteristic high resistance of diabetic urine is not mentioned. Chapters follow upon electro-therapeutics, electro-surgery, and the hydro-electric bath, all of which are most instructive reading. Dr. Hedley's book is to be confidently recommended to medical practitioners, and we trust that it will meet with the success which its merit deserves. DAWSON TURNER.

Blood and Blood Pressure. By G. OLIVER, M.D. London:
H. K. Lewis. 1901.

MEMBERS of our profession are much indebted to Dr. Oliver for not only adapting many physiological pieces of apparatus for clinical purposes, but also for introducing new instruments which have been proved to be of value both to the physician and physiologist. Portions of the material published in this form have already appeared in this journal and in the Croonian Lectures, but much additional clinical and experimental matter has been added. The instruments described in the text are so well known that they require no description here. The one which is best known, and is probably also the most valuable, is the hæmoglobinometer. With regard to the value of the hæmocytometer and arteriometer it is more difficult to speak. The former cannot replace the method by direct enumeration, and the latter, although of some value, cannot be used in all cases. The hæmodynamometer is a very useful instrument for clinical work. The remainder of the book deals with physiological and clinical variations (the distinction is Dr. Oliver's) in the distribution of the corpuscles, and also with the influence of different agents on the blood pressure. The book is an original contribution to a very important subject, namely, the investigation of the blood and circulation by as far as possible accurate clinical apparatus.

T. H. MILROY.

Leçons de physiologie expérimentale. By RAPHAEL DUBOIS et COUVREUR.
Paris: Georges Carré et C. Naud. 1900.

THIS forms an exceedingly useful laboratory book in experimental physiology, as it covers ground not usually traversed in books of the same class. The first part deals fairly fully with the graphic method used in experimental physiology, and naturally the apparatus of Marey and his followers figures here prominently. The second part is very useful, as it describes methods employed in operative work, holders for animals, anæsthetics, instruments used in vivisection, asepsis, and antisepsis. The third part deals with the methods employed in investigation of the central and peripheral nervous systems; while the fourth, which is much the largest section, takes up mostly the remaining systems, and describes not only the more purely experimental methods, but also the chemical examination of the fluids of the body. The ground to be covered is too extensive for anything except a general account of experimental methods; but when that has been said, and regret expressed that so little attention has been paid to methods used in Germany or this country, one can safely recommend the book as a most interesting contribution to experimental physiology.

T. H. MILROY.

Atlas and Epitome of Gynæcology. By Dr. OSKAR SCHÆFFER, Privatdocent of Obstetrics and Gynæcology in the University of Heidelberg. Translation from the Second German Edition, by RICHARD C. NORRIS, M.D. Philadelphia and London: W. B. Saunders & Co. 1900.

DR. NORRIS has translated for the benefit of English readers a book which has found a wide acceptance in Germany, and which represents in many respects a new departure. Its general scope is well defined by the words "Atlas and Epitome," and the author's purpose as set forth in the preface is to "give the student and the practitioner an opportunity . . . to complete his necessarily limited personal observations in the clinic." Great industry has been brought to bear upon the difficult task of producing illustrations of clinical conditions, designed to impart the knowledge which is best gained by clinical experience. The clinical teaching of gynæcology is notoriously deficient in medical schools, and it cannot be said that a book of this kind is not required.

The measure of success which the author has achieved is perhaps as great as the limitations imposed upon him by the size of the book would allow. Most of the coloured plates represent drawings *ad naturam,* coloured in representation of actual clinical tints. The art of the colour-printer has perhaps barely reached a point at which this can be done with consistent success, but, on the whole, the plates give a fairly reliable picture of the conditions they are designed to represent. Frequently clearness is sacrificed to colouring, but in other instances, as in the morbid conditions of the cervix, the colouring is more accurate than the drawing. A large number of coloured diagrams are introduced which contrast most favourably in clearness with the coloured illustrations. Plate xiv. gives four diagrams of anteversion of the uterus, and in these the anterior reflexion of the peritoneum is placed on a level with the fundus instead of the internal os; anatomical inaccuracies of this kind are scarcely pardonable in diagrams. A large number of illustrations of microscopic appearances are also presented, and these are without exception faithful and excellent representations of minute anatomy.

An atlas must stand or fall by its illustrations, and a careful examination of this book leads us to the conclusion that, although scientific accuracy cannot be claimed for it, yet the illustrations are sufficiently correct to prove useful in laying down the first lines of an acquaintance with gynæcological conditions. The epitome is necessarily brief, and is written strictly from a practical standpoint. Curious errors appear here and there, however, such as the statement on p. 29 that uterus didelphys is only seen in monsters incapable of independent existence. In the *Transactions of the Obstetrical Society of London* for 1895, a paper appeared by Giles in which was given a record of twenty-five cases of uterus didelphys occurring in living adults. T. WATTS EDEN.

A Treatise on Medical Jurisprudence. By George Vivian Poore, F.R.C.P. London: John Murray. 1901.

This book is based on lectures delivered by the author at University College, London, and we have no hesitation in saying that the students were fortunate who received such an admirable and interesting review of the subject. We have read it with great enjoyment, partly owing to the fascination of the colloquial style in which it is written, and the manner in which use is made of illustrative cases to fix in the mind the salient points in subjects under discussion, and partly also owing to the frequent out-crop of the author's individuality of view and originality in description.

There is no question that the student, medical man or lawyer, is the gainer by having placed before him the broad general principles of a subject, and the practical experience of a man who for many years has been associated with medico-legal work, and who, in addition, has brought acute observation and a sound common sense to bear upon the many questions of this nature which have to be encountered by the general practitioner. While for these reasons we welcome the volume, it cannot be considered a *text-book* in the sense in which, for example, Dixon Mann's book is. It does not go fully into the various forms of violent death—wounds, infanticide, abortion, etc.; and in toxicology only a selection of the chief poisons are dealt with. The volume will not therefore be of much use in deciding questions of difficulty or of doubtful accident, suicide, or murder, nor does it afford such details in regard to methods of investigation as may be required in actual practice. The absence of reference to carbonic-acid and carbonic-oxide poisoning seems to be an omission. These gases surely were entitled to notice, from the frequency with which death is caused by them. There are a few errors which we have noted, but they are mostly of minor importance. On page 161 the sentence occurs: "We have no verdict of not proven in England; and, I take it, the difference between not guilty and not proven is, that if a jury returns a verdict of not proven, the prisoner may be brought up again on the charge, and re-tried when additional evidence is procured." This is, of course, erroneous; the Scotch verdict of not proven relieves a prisoner from any further proceedings. Had this not been so, Madeleine Smith—the case referred to by the author in connection with the above sentence—would almost certainly have been re-tried, in view of certain evidence afterwards procured.

In conclusion, we wish the volume the success it undoubtedly deserves as an excellent treatise, and also as a memento of Dr. Poore's many years' occupancy of the Professorship of Forensic Medicine at University College. Harvey Littlejohn.

Introduction to Medical Jurisprudence. By William M'Callum. London: Baillière, Tindall, & Cox. 1901.

This volume of 146 pages attempts to give the essentials of medical jurisprudence and toxicology without being simply a "cram" book. In some respects the author has succeeded in his task, and has produced a very readable book, written in clear language, and containing a brief account of the various subjects embraced in medical jurisprudence.

Exception must, however, be taken to many of the statements made—as for example that, in removing the skull-cap, the use of the chisel is permissible in a medico-legal post-mortem; that the parchment-like constriction mark of the cord in hanging is due to ecchymosis; and that in this form of death an erected penis is amongst the frequent post-mortem appearances. (When are we to hear the last of this so-called sign?) The author appears to have some doubt as to the impossibility of suicidal throttling, while in the treatment of strychnine poisoning he seems scarcely to appreciate the full value of chloroform.

Harvey Littlejohn.

Studies in Human and Comparative Pathology. By Woods Hutchinson, A.M., M.D., Professor of Comparative Pathology and Embryology in the University of Buffalo. London: Henry J. Glaisher. 1901.

These studies contain a large body of facts and a large number of speculations. The latter chiefly tend towards attempts to explain pathological processes from an evolutionary standpoint, and are usually unjustified by the facts advanced to support them. It may be true, as Dr. Hutchinson thinks, that the occurrence of the nucleated red blood corpuscles in profound anæmias is an instance of a reversion on the part of a recently specialised cell to the more primitive condition of our ancestor the frog, but how much farther are we on when we embrace this explanation? Pathology must explore every avenue of inquiry before falling back thus on some hypothetically fundamental tendency of protoplasm, and even then the question, Why this reversion? would remain. As a matter of fact, evolution is the most glib-mouthed and specious of all the pseudo-philosophies, and the less pathology has to do with it the better. Incidentally, Dr. Hutchinson's language enables us to protest against the common mistake the evolutionary pathologist makes, of endowing leucocytes with reason and making them amenable to a mobilisation system, based on the methods of the German War Office. Where our author is dealing with facts, many of them the result of great personal labour, his book is much more valuable. We have here an interesting discussion on the possibility of an active contractility of the small blood vessels of the body, and there is collected a great mass of information on the comparative pathology of tumours, especially of cancers. The chapters on tubercle in man and the lower animals are very suggestive, and it will be found that Dr. Hutchinson has anticipated in an able way many of the ideas to which Koch has recently given notoriety.

James Ritchie, Oxford.

A Text-Book on Practical Obstetrics. By E. H. Grandin, M.D., and G. W. Jarman, M.D. Third Edition. Philadelphia: F. A. Davis & Co. 1900.

The third edition of this text-book of practical obstetrics is revised and considerably enlarged. After thirty pages of useful anatomy, twenty pages of embryology are included, which appear somewhat out of place in a purely practical work. The value of this embryological portion of the work is reduced by the efforts of the authors at excessive condensation, and in several respects their descriptions are positively misleading. The remainder of the work is divided into four portions, dealing with pregnancy, labour, the puerperium, and obstetric surgery. The practical directions given are in the main sound, and full of common sense, though they differ in many points from the teachings of British obstetricians. The most striking feature of the work is its illustrations, which are not conspicuous for their utility or for their beauty. It is difficult to find an excuse for the publication of a photograph of a practitioner "wiping off the vestibule," and a second in which he is seen "inserting the catheter." There are nine photographs of four (sometimes five) men engaged in operations such as "clamping the cord," "expressing the placenta," and "washing the eyes of the fœtus." Many of the other plates are equally unedifying, and a number of them merely represent obstetric operations as performed on the dummy. Apart from its illustrations, this is a useful and complete exposition of modern American obstetric practice. W. E. FOTHERGILL.

Eléments d'anatomie gynécologique clinique et opératoire. By PAUL PETIT, with a Preface by Prof. SÉBILEAU. Paris: Carré et Naud. 1901.

THIS very elaborate anatomical study deals with the structure of the female pelvis and the adjoining regions in a more full and detailed manner than is usual either in anatomical or in gynæcological works. It is written from the operator's point of view, and insists particularly upon the relationships of organs, the vascular bundles, and the planes of cleavage in connective tissue. Histology does not form a part of the work, which is divided into four portions, dealing with—(1) the vulvar, perineal, and anal regions; (2) the pelvic cavity; (3) the anterolateral abdominal wall; and (4) the iliac fossa. There are thirty-two plates, each of which beautifully represents a dissection by the author, who has devoted three years to their preparation. The book is written with method, and arranged upon a good plan; the descriptions are clear; the style is precise, concise, and elegant. The somewhat monotonous nature of a series of anatomical descriptions is relieved by the numerous clinical and operative considerations which are introduced. Dr. Petit has rendered a great service to gynæcologists in having published so thorough and complete a study of pelvic anatomy.

W. E. FOTHERGILL.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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The Pros and Cons of Cycling.

The extremely important question, important to men and still more to women, of the results of cycling, the good and the evil of it, the when and the how it may be pursued and benefit accrue, or indulged in and injury follow, is considered from all sides, supported by all the more important contributions published on the subject during recent years, by Professor Schiefferdecker of Bonn, in an original article in *Schmidt's Jahrb.*, May 15, 1901, Bd. cclxx.

It is a subject which concerns the majority of medical men, be they physicians, surgeons, gynæcologists, or general practitioners; constantly calling for responsible advice, whether use of the cycle be proper or not in individual cases; be the source of injury or harm in cases of disease, pathological lesion, or ill-health. It has to be borne in mind that the term cycling is divisible into two classes, very different in act and kind; the quiet cycling along roads level or with only slight gradients, and without effort or strain; and the cycling which implies expenditure of much energy in the ascent of steep hills, struggling against strong winds, or when high speed is maintained. Schiefferdecker deals only with the cyclists of the first category. The advantages of cycling over walking and climbing, regarded as a means of exercise and therefore of encouraging metabolic processes (the end of all physical exercise, taken apart from duty), lie in the great number of muscles employed with much regularity for some length of time, and this, of great weight, the consequent relatively slight stress placed on each muscle.

The more muscles that act together, the greater is the yield of power, the quicker the metabolism; idem, the later do they tire.

Walking *versus* cycling compares unfavourably; time is lost; movements in the fresh air are less rapid; certain groups of muscles are more especially taxed; more work is done by the body in the same time with less result. Still greater is the superiority of cycling over hill climbing. [The Alps, and the like, may be when tied to guides and personally conducted; this statement takes into consideration only the mechanical ascent of a slope or of stairs; true climbing employs every muscle of the body.—A. L. G.] Riding is not so beneficial. The movements of the rider and his expenditure cannot be controlled sufficiently to foresee what the sum of the exercise will amount to on any occasion, for a horse may have a will of its own, and he on its back have to do more than is good for him before reaching home. (Mr. Sponge?)

A minute analysis of the various muscles which combine to propel and support the cyclist in greater or less degree, as compared with those called upon in walking and climbing, follows; the two latter apparently being regarded as similar modes of motion. The latest observations as to the amount of energy expended by a cyclist, in covering a certain distance on the flat, show that it does not appreciably differ from that of a pedestrian over the same. But the cyclist calls on a greater number of his muscles than the walker, and so, distributing the sources of energy, lessens fatigue. The walker also supports the weight of most of his body on his legs, of all his body on his soles; they tire sooner than the legs of the cyclist with only their own weight to support. The relative feeling of ease with which cyclists accomplish what would deter them from expending, if on foot, constitutes one of the greatest dangers of this form of locomotion; for they are often led to exceed the limits compatible with health; especially if they have to contend with strong winds and steep ascents.

Schiefferdecker concludes, from his study of the subject, that with good reason cycling may be regarded as a very satisfactory and important therapeutic agent; hopes that his article may be the means of inducing many patients to use, many physicians to recommend, it. In disturbances of nutrition and in neurasthenia it is especially beneficial. Many and various chronic diseases and their sequelæ improve, or may even recover, under the influence of the greater force of the circulation and the removal of venous stasis caused by it. In all acute diseases cycling is inadmissible. In fact, cycling often proves to be a valuable remedial agent; still more does it offer to the mass who live and work confinedly in cities a means by which they can neutralise the evils resulting from their working environment. Therefore is it a very important factor in civilisation, and for the well-being of the civilised. Doctors have the greatest say in the matter, as in all kinds of hygienic progress, and to them it falls to be the teachers of the public and advisers of those confined in towns; and by encouraging cycling they may do much good to the multitude.

Although the writer's conclusions are so optimistic, many of his preceding statements and quotations are sufficiently serious to give one pause. The authorities referred to in connection with each separate organ or system apparently only agree by differing. The increased frequency of the cardiac contractions, inseparable from all forms of muscular exertion, is of course incident; but the various experts quoted in the text give so vague an impression of what their statements amount to, that the author's opinion, that the increased pulse rate from cycling has been rated at a higher value than is really the case, serves only to italicise this uncertainty.

In cases of heart disease, valvular or otherwise, the propriety of cycling is a very difficult matter, for before a logical conclusion can be arrived at, a very exact diagnosis of the cardiac lesion and condition, as well as of the blood vessels, must have been made. And, further, the effect of exertion on the organ must be studied carefully before cycling can be safely recommended in any case. In fatty conditions of the heart the utmost caution is called for.

Cases of transient albuminuria have frequently been recorded after lengthy runs, which may be productive of no permanent damage to the kidneys, if occurring only once or twice, but may lead to nephritis if frequently occasioned. In all renal disorders cycling should be forbidden. Numerous examples of perineal, urethral, prostatic, and other kindred lesions are met with in males; chiefly owing, the author believes, to unsuitable saddles, and from wrong postures. Stricture of the urethra and enlargement of the prostate may be sequels. In women, analogous lesions are often seen. No girl between 11 and 16 years of age should be encouraged to cycle, and no woman during her menstrual periods, nor when pregnant. In chronic affections of the female pelvic organs, cycling may be productive of good; in all acute lesions of the same, should be prohibited. As to the effect upon these organs, relative to sexual function in men, increased desire may arise after cycling, chiefly because of the greater metabolic activity induced by it, as in most other forms of stimulating exercise. In women, the author takes a very guarded line; lays stress on the form of saddle, a proper posture; alludes gingerly to the matter of pudendal irritation, congestion, and their attendant risks [a matter probably of no little importance; and the more so because so difficult to investigate and impossible to publish], concluding as already indicated.

[*Note.*—Man was meant to walk on his two legs. He discovered, in time, that a horse with four legs, and a docile animal, could be induced to carry him from place to place, and help him in war; so he rode; expending thereby far less energy per mile than if on foot. In time he found he could attain the same speed, at less expense and with less trouble, on a cycle propelled by himself, although he expended the same energy in a shorter time than he would have in walking or riding the same distance; thus he saved time, increased his output of energy, but at the same time his mind was kept on the stretch very frequently by reason of the many cares associated with his new mode of progression; was tempted by the apparent diminution of physical work to often overdo it; and was pleased to seat himself (or herself) for hours on a surface little adapted to the part sat upon, suffering frequently therefrom, but bearing it in silence as a necessary evil connected with the custom. Cycling for convenience in business, and to expedite visiting, will without doubt continue; as the means of taking brief constitutional exercises it may be the same; but cycling over long distances, or daily and all-day cycling, if posterity is to be regarded, will speedily cease.—A. L. G.]

SURGERY.

UNDER THE CHARGE OF

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THE AGE OF SYPHILITIC INFECTION IN RELATION TO SEX AND TO SOCIAL CONDITIONS.

BY means of reliable statistics, Fournier has investigated the frequency of acquired syphilis, according to sex and to social surroundings. The author relies on his father's notes for the statistics relating to private patients, on the records of the St. Louis Hospital for those relating to the working classes, and on the records of MM. Barthélemy and Le Pileur for those relating to prostitutes. The observations refer to 17,406 cases of syphilis, all of venereal origin.

1. *Private patients.*—In the male, the liability to infection begins at puberty—five cases at the age of 14—and gradually increases in frequency till the twentieth year. The maximum number of infections occur during the next seven years, the highest of all corresponding to the twenty-third year. The diminution in frequency after the twenty-seventh year is ascribed to abatement in sexual ardour, and to the pretty general occurrence of marriage. With increasing years, the number of infections diminishes more and more rapidly, although isolated senile cases are met with; and the author has himself observed in an octogenarian an indurated chancre, followed by constitutional symptoms. The frequency of syphilis in the male of the better classes may be said to be proportionate to the sexual requirements prevailing at different periods of life, and may be expressed in percentages as follows:—

From 14 to 19 years	8·20 per cent.
„ 20 „ 29 „	65·67 „
„ 30 „ 39 „	18·31 „
„ 40 „ 49 „	5·35 „
„ 50 „ 59 „	1·89 „
„ 60 „ 69 „	0·54 „
„ 70 and upwards	0·02 „

In the female, the age frequency is very similar to that given. The maximum, however, occurs between the ages of 18 and 24, and the highest number of all occurs in the twentieth instead of the twenty-third year. For obvious reasons, there is no senile syphilis in women.

2. *Hospital patients.*—The figures are very similar to those observed in private practice. The maximum number of cases, however, occurs a little earlier—in the male from the seventeenth to the twentieth year, and in the female reaching the maximum in the eighteenth year. From the point of view of the prevention of syphilis, this precocity of syphilis in female hospital patients is of great importance.

3. *Prostitutes.*—The maximum frequency occurs still earlier in life. Beginning at the fourteenth year, the number rapidly rises until it attains the maximum at the age of 18. The number falls after the nineteenth year, so that at the age of 23 there are fewer cases than at 15. After the age of 23, syphilis is rarer in proportion in prostitutes

than in hospital or private patients, because, after a certain age, syphilis is rare in prostitutes because they have had it already. After 40, the frequency rapidly diminishes, and soon disappears altogether.

The most important fact brought out by this statistical research is the frequency of primary syphilis before the years of discretion are attained—14 to 20 per cent. in the case of the male, while in the female it ranges from 31·3 per cent. in private patients, 48 per cent. in hospital patients, to 63 per cent. in prostitutes. Attempts directed towards the prevention of syphilis must therefore chiefly concern the young.—*Ann. d. mal. d. org. genito-urin.*, Paris, July 1901.

Treatment of Innominate Aneurysm.

Grenet and Piquand give an interesting *résumé* of this subject, and a useful table of all the recorded cases, including the treatment employed and the results. They arrive at the following conclusions:—The simultaneous ligature of the carotid and subclavian arteries is the only operation to be recommended in the treatment of innominate aneurysm. The operation is not a dangerous one, apart from certain contra-indications, such as obliteration of the left common carotid, which may entail cerebral complications, or the existence of aortic dilatation and incompetence, which render the operation dangerous. If the operation is to be done at all, it should be carried out as early as possible, because the beneficial results to be obtained diminish with the lapse of time, in virtue of the dilatation of collaterals, and because the more the aneurysm develops the more likely it is to compress neighbouring vessels and lead to obliteration of the left carotid or vertebral arteries, conditions which may contra-indicate the operation because of the risk of cerebral complications. When it is impossible to ligature the subclavian, on account of the size and extent of the tumour, one should ligature the third part of the axillary artery, which may be successful, although it fails in a certain number of cases because of the development of the collateral circulation. If, after the double ligature, the aneurysm continues to extend towards the right subclavian triangle, one may consider the ligature of the chief branches of the subclavian, and especially the vertebral. If the tumour extends towards the left subclavian triangle, one may consider the ligature of the left subclavian artery.—*Arch. gén. de méd.*, Paris, May 1901.

Sterilisation of Catgut by Boiling.

Renner of Prague recommends the following method of sterilisation, which has yielded good results during the last eighteen months:—The best raw catgut is tightly coiled on a metal frame, and is placed for twenty-four hours in a 5 per cent. watery solution of formalin. It is then boiled for ten minutes in pure well water; the gut swells a little, but does not lose its shape. It is dried in a hot chamber, and preserved in a 1 per cent. solution of corrosive sublimate in alcohol. The gut thus prepared may be safely used, both for ligatures and for sutures.—*Centralbl. f. Chir.*, Leipzig, August 17, 1901.

PATHOGENESIS OF RANULA.

MM. **IMBERT** and Jeanbrau contribute an exhaustive memoir on this subject, and arrive at the following conclusions:—That there is one variety of cystic tumour on the floor of the mouth, a special form of ranula, the spaces of which are lined by ciliated epithelium, and which probably originates in connection with the anterior end of the thyreoglossal duct. In the common ranula, the cyst cavity is lined by a layer of embryonic connective tissue, without any trace of epithelial cells; hence the authors do not accept the view that ranula is a result of mucoid degeneration of the sublingual gland (Suzanne), or that it is of the nature of a salivary retention cyst. They believe it is of congenital origin, resulting from some error of development, at present unknown, but possibly associated with the remains of the branchial clefts. The best treatment of ranula is complete extirpation, although this is not always easy, because the wall of the cyst is sometimes extremely thin. If the submaxillary or sublingual gland is closely adherent to the cyst, it should be removed at the same time.—*Rev. de chir.*, Paris, August 1901.

COCAINISATION OF SPINAL CORD RESULTING IN DEATH.

BROCA recorded this case before the Paris Surgical Society. A woman, æt. 62, insisted on an exploratory operation for a foreign body, supposed to have entered the sole of the foot, in spite of the negative results of skiagraphy. One c.c. of a 1 per cent. solution of cocaine was injected within the spinal membranes. Anæsthesia was rapidly induced, the operation was satisfactorily completed, and the patient appeared to be quite well. Four hours later she began to feel uncomfortable, and to complain of pains in the loins, which became more and more severe. Seven hours after the injection the face was livid and pale, she was extremely agitated and anxious, and she died during the night, eighteen hours after the injection. There was no autopsy. Nélaton attributed many of the unpleasant symptoms attending spinal cocainisation to impurities of the drug employed, and Rochard corroborated this view.—*Rev. de chir.*, Paris, August 1901.

THE DILATATION OF TIGHT STRICTURES OF THE ŒSOPHAGUS.

HENLE of Breslau adds an improvement to Socin's method of finding a passage through an œsophageal stricture which is impermeable to bougies. After a preliminary gastrostomy, the patient swallows a silk thread to which are attached a number of small lead shot; on drinking some fluid the shot pass down into the stomach, and the surgeon endeavours to bring out the thread at the gastric fistula. A stronger thread is attached and drawn through the stricture, and then rubber tubing of increasing thickness is drawn through in turn, and allowed to remain in the stricture. The difficulty consists in bringing out the thread at the gastric fistula, and Henle overcomes this by using iron instead of lead shot, and getting hold of these by means of an electromagnet introduced through the gastric fistula. The magnet is shaped like a sound for the urinary bladder, 28 cms. in length and 1 cm. in diameter. When the current is turned on, the iron becomes magnetic enough to attract the iron shot, and to hold them firmly enough to allow of their being brought out at the fistula. Henle employs three or four shot, of a diameter of 1 to 1·5 mm., which are attached to the silk thread at intervals of 5 cms. The procedure has proved successful in two cases of stricture, one following actinomycosis, and the other on corrosive poisoning.—*Centralbl. f. Chir.*, Leipzig, August 24, 1901.

THE CLOSURE OF DEFECTS IN THE BONES OF THE SKULL.

GREKOW has made further observations on the subject, and arrived at the following conclusions:—The formation of new bone takes place from the diploë, from the pericranium, and from the dura mater, and chiefly from the first of these by the osteoblasts of the matrix tissue. The formation of new bone may be interfered with as a result of the growing together of the pericranium and dura, by the interposition of adjacent tissues, and by necrosis of the bone forming the margin of the aperture. The growth of young bone takes place in a concentric fashion, or in radiating lines. The insertion of any material into the gap stimulates the bone-forming elements, separates the dura from the pericranium so as to prevent their adhesion, and serves as a scaffolding for the young bone which is growing in from the margins. The best material for the purpose is bone which has been calcined in a furnace, and it is advisable to freshen the edges of the gap, and remove all trace of necrotic tissue.—*Centralbl. f. Chir.*, Leipzig, August 24, 1901.

TREATMENT OF SKIN LESIONS BY THE RÖNTGEN RAYS.

SJÖGREN and Sederholm of Stockholm record the results which they have obtained from October 1899 to December 1900. They believe that the beneficial effects are due to the X-rays themselves, and not to others which may be mixed with them. In twenty-seven cases of lupus, the results were good in eighteen. In all five cases of scrofuloderma the results were excellent; also in ten cases of chronic eczema. In four cases of pruritus of the anus and vulva the patients were completely relieved. Psoriasis was not benefited. All ulcers improved under treatment; fresh granulations formed, and healing took place. In hypertrichosis the Röntgen rays caused the hair to fall out, but it grew in again, requiring a repetition of the treatment. If, in the first instance, the rays are thoroughly pushed, the skin may undergo atrophy, so that no more hairs are formed. In rodent cancer and superficial epithelioma, the new growth is made to shrink and finally disappear, and warts of the skin are similarly influenced.—*Fortschr. a. d. Geb. d. Röntgenstrahlen*, Hamburg, 1901, Bd. iv. Heft 4.

THE ELEVATION OF DEPRESSED SCARS.

DELANGRE has employed the hypodermic injection of vaseline for this purpose. In December 1899, in a case of depressed scar, resulting from a boil, he injected 1 c.c. of warm sterile vaseline; the injection was repeated some weeks later, with the result that the scar was elevated to the general skin level, and remained there. Since then he has repeatedly employed the method, with good results, even in the case of extensive depressed scars which are adherent to bone. Care must be taken not to inject the vaseline into a vein.—*Bull. Acad. roy. de méd. de Belg.*, Bruxelles, 1901, No. 4.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Method of Obliterating the Uterine Cavity.

Koslenko (*Centralbl. f. Gynäk.*, Leipzig, 1901, No. 17), in cases where it is necessary to prevent conception, advocates the use of superheated steam applied to the uterine cavity The steam, under a pressure of two atmospheres, is employed for a period of one minute. On the sixth day after the application, as a rule, the mucosa and part of the muscular layer will be expelled. The cervical canal becomes completely closed, except at the os externum. He considers that this method is easier and safer than either oöphorectomy or salpingectomy.

Cocainisation of the Nose for Dysmenorrhœa.

Schiff (*Wien. klin. Wchnschr.*, No. 3) has investigated forty-seven cases with reference to the relation stated by Fleiss to exist between the nasal mucous membrane and the female reproductive organs. The portion for which this relation is claimed is that covering the anterior end of the inferior turbinated bone and the tubercle of the septum. Those are regularly congested, swollen, and sensitive during menstruation. The application of cocaine to those regions was made by Schiff in forty-seven cases of dysmenorrhœa, and of those, thirty-four were relieved. Dysmenorrhœa resulting from mechanical causes was not affected in any degree. But when the condition arose from nervous causes, or from disorders such as tumours of the annexæ, parametritis, etc., marked relief from the symptom was obtained. Schiff employs a 20 per cent. solution of cocaine on cotton-wool to the so-called "genital regions" of the nose. If success is thus obtained, he advocates electrolysis of the same areas, as he found that permanent cure of dysmenorrhœa followed.

The Influence of Pregnancy on Phthisis and the Therapeutical Value of Induced Abortion.

Kaminis (*Ver. f. innere Med. zu Berlin*, June 1901), as a result of observations made in Senator's clinic on fifty cases, finds that in 66 per cent. pregnancy had a detrimental effect on phthisical women, and in no case was any benefit derived from the combination. The nausea and want of appetite accompanying pregnancy interfere with nutrition; hæmoptysis often results from the vomiting of pregnancy, and further pressure on the diaphragm and retraction of the lungs impedes respiration, and the pulmonary circulation. As a result of the ill effects of pregnancy in phthisical cases, Kaminis is a strong advocate of terminating gestation. He prefers inducing abortion to premature labour, as it is less dangerous, and the emptying of the uterus at an earlier date compromises the health of the mother to a lesser degree.

In 70 per cent. of the cases where this line of treatment was adopted, the pulmonary condition remained stationary.

Round Ligament Ventro-Suspension of the Uterus.

Gilliam (*Journ. Am. Med. Ass.*, Chicago, June 1901) performs this operation as follows:—A median incision is made through the abdominal parietes, 3 or 4 in. in length; the fundus uteri is now brought forward. The round ligament on one side is seized by the fingers or a blunt forceps, and brought up to the opening. With an aneurysm needle a silk thread is carried under the ligament, 1½ in. from the uterus; after withdrawing the needle, the two ends of the ligature are brought out of the abdomen and seized by catch forceps. The same method is adopted in dealing with the other ligature. The muscle fascia and peritoneum at the margin of the incision, and at the distance of 1 in. from the lower angle of the wound, are now seized on each side by volsellæ. In this way the layers are pinned together, and retraction of the muscle prevented. A specially devised curved perforating forceps are now thrust through the whole thickness of the abdominal parietes, with the exception of the skin. The points of the forceps pass into the peritoneal cavity, and the thread holding the round ligament is seized. The perforation is made in a slanting direction, the forceps entering the peritoneal cavity 1 in. from the edge of the wound. The clamp forceps holding the ends of the ligature is now removed and the perforating forceps withdrawn, bringing with it the ligature, which in turn carries the round ligament through the perforated wound in the abdominal walls. To those it is now fastened by a catgut suture passed through its base, including the tissues on either side. The opposite side is treated in a similar manner. A continuous catgut suture is now used to bring together the fasciæ, and this is made also to include the portions of the ligaments which project beyond the ligature which has been used to fix them to the abdominal walls. In this way they are approximated to the middle line. Gilliam advises that not all the slack of the distal extremities of the ligaments should be gathered up, otherwise a feeling of tension will be produced.

Dilatation, Curettage, and Prolonged Drainage of the Uterus in Salpingitis.

Beaussenat and Blum (*Rev. de gynéc. et de chir. abd.*, Paris, June 1901) advocate this indirect treatment of salpingitis, first pointed out by Walton. For dilatation they recommend the use of laminaria, perforated so as to allow of drainage of the uterine secretions. By this method the whole uterus is affected in a regular and progressive way;

the tonicity of the cervix is removed and the canal left permanently open. By using a series of tents, the cervical canal can be opened to a size sufficient to permit of the passage of the forefinger through the inner os. This will occupy from two to four days. After curetting the uterus, a large rubber drainage tube is introduced into the cavity, the fornices are lightly packed with strips of antiseptic gauze, so that the tube may remain in the middle of the vagina; the tube should not project more than half an inch from the os externum. The uterus is washed out every second day, and the tube and dressings are replaced by fresh ones. After a period, varying from ten to twenty days, the uterine cavity will be found to contain nothing but mucus. Drainage and intra-uterine douches are now stopped. In favourable cases it will be found that the adnexal tumours have markedly diminished in size or disappeared. The authors insist that this method should always be tried before recourse is had to laparotomy.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Treatment of Aphasia.

Gutzmann lays chief weight on the systematic utilisation of optical and tactile impressions. Many cases of aphasia recover spontaneously, while even those chronic cases which have persisted for months may recover under appropriate treatment. Kussmaul held that age was the chief factor in the prognosis, but the author thinks that the chief element is the individual sharpness in picking up impressions. Motor aphasia has not a worse prognosis than sensory aphasia, or paraphrasia with confusion. The author commences his treatment by teaching the individual letters and then simple sounds. He commences with the vowels, as they only require the lips and teeth in their formation. The *a* sound in *was* is the best one to commence with, as it can be pronounced without moving the lips, if the lower jaw be depressed. In pronouncing *o* the lips are used and the mouth opening is narrowed, while *u* requires still further narrowing. Then *a* and *e* are taught, *e* requiring the lower jaw to be raised till there is only a narrow slit between the palate and the tongue. In trying to repeat the sounds, the patient should keep his eyes fixed on the mouth of the teacher. As muscular efforts to reproduce such movements are often very imperfect, it is good to let the patient observe his own efforts in a looking-glass, when he is enabled readily to see how his attempts fail, and can easily remedy the fault. The simplest consonants are *p* and *b*, then comes *m*. In order to demonstrate to the patient how *m* is pronounced, it is necessary to let him feel the air passing through the nose. As soon as the consonants are learnt the patient should practise simple associated sounds, such as *pa*, *pe*, *po*, etc. Synchronously with these lessons the patient should be taught to write with the left hand. In this way the right hemisphere is taught to appreciate the finest muscular movements, which is a useful preparation for speaking. As a rule, there is a remarkable parallelism between the improvement in speech and writing. In many cases writing seems to make a more ready impression than speaking. The author insists on the necessity of constantly associating names with objects. In cases of sensory aphasia where, though hearing is intent, there is no understanding for spoken words, the author avails himself of sight, and trains his patient in lip reading, as is commonly done with deaf mutes. In France, where a similar method of teaching aphasics is in general use, great weight is laid on preparatory exercises, which have the object of increasing the muscular power and educating the muscle sense of the muscles of the tongue and mouth. By means of a mechanical apparatus, connected with a glosso-dynamometer, the lips and tongue can be trained both in speed and energy, which usefully prepare for efforts at speech. The normal muscular sense of the tongue and mouth muscles is very low, but it can easily be increased by practice. We see, then, that while in normal conditions the chief reflex is by the auditory path, in abnormal conditions tactile and optic sensations may acquire greater importance.—*Berl. klin. Wchnschr.*, July 15, 1901.

CARE OF THE MOUTH IN SYPHILIS.

Grünfeld does not hold with those authorities who claim that general specific treatment cures local manifestations in the mouth and throat, without any local treatment. He goes to the other extreme; and on the ground that in only a very few cases these parts remain free, and that in almost every case, sooner or later, syphilitic erosions or ulcerations occur, he employs a local treatment from the time of the development of the secondary eruption. Whether the throat is affected or not, he employs a mild astringent lotion for gargling or irrigating the throat and mouth. He prefers pot. chlor., of which 75 grs. are dissolved in 1 pint of warm water. This solution can also be used for cleaning the teeth. The gargle should be used at least three times in the day. Even under the most careful attention, plaques and erosions may develop. For oral chancres he recommends antiseptic gargles or irrigations. For cauterising sloughing patches, he uses a concentrated alcoholic solution of perchloride (½ per cent. to 1 per cent.), applied by a brush, or better by a tampon. In very obstinate cases the Paquelin or galvano-cautery may be necessary. As soon as the surface is clean, grey plaster is applied. It requires to be frequently changed. In the papular stage the antiseptic mouth washes are indicated. To insure thorough mechanical cleansing, an irrigator should be used. It is well to add some essential oil to the wash. Another good plan is to treat the patches by a spraying apparatus, with a watery solution of alum or tannin (½ per cent. to 2 per cent.), or carbolic (1 per cent. to 3 per cent.). In treating papules, it is essential to prevent the formation of crusts. Crusts should be softened with oil or glycerin, and then removed. They can be prevented by using white precipitate ointment (1 in 25) several times daily. For cauterising the plaques, a 3 per cent. to 5 per cent. spirit solution of perchloride should be applied to the patches by means of small tampons, and must only be used by the medical man.

The procedure should be repeated every alternate day, and every ulcerated patch should be touched. The sound parts must be protected, and the mouth well washed out at the close.

With very sensitive patients it may be necessary to use a 2 per cent. cocaine solution.

Leukoplakia deserves special mention. Here strong caustics must not be used, and it is best to use very weak solutions of pot. chlorate or pot. permanganate. Locally the patches may be painted with the following:—Pot. iodide, 15 grs.; iodine, 1½ grs; glycerin, 4 drs. The place should be dried with gauze before the paint is applied.

Most gummatous ulcers heal well under medical treatment. It is well to use caustics freely, the best being lunar caustic. The less the ulcer is spared the better is the result. The caustic is not re-applied till the slough is cast. To prevent mercurial stomatitis, the author firmly believes in careful cleansing of the teeth two or three times a day, especially just before going to bed.—*Centralbl. f. d. ges. Therap.*, Wien, August 1901.

TREATMENT OF LUMBAGO.

In vigorous subjects the abstraction of blood constitutes the best, the most rapid, and the most efficacious local treatment. Vapour baths are uncertain. Hot applications diminish the pain, though caution in their use is necessary, lest they cause burns lasting longer than the lumbago. Turpentine stupes, or inunction of a mixture of equal parts of menthol, camphor, and chloral hydrate, are frequently successful. At the height of the attacks massage can only be used with gentleness and moderation. Slight spraying with methyl chloride over a large area is more successful than intense local action. In obstinate cases dry faradisation, though painful, is very efficacious. The current should be as strong as the patient can bear, and should be continued till the whole back is reddened. Interarachnoid injections of a very weak cocaine solution give great relief. Better, because less dangerous, is the epidural injection made through the coccygeal ligament, between the dura mater and the osseous column. Subcutaneous injections of morphia are not to be recommended. Instead, a mixture of antipyrine and cocaine may be injected. For traumatic lumbago, massage and prolonged baths are indicated. In pure rheumatic lumbago the salicylates have no action. In prolonged cases, oil of turpentine in capsules or emulsion seems to have some effect. In other cases it may be necessary to treat anæmia, constipation, etc. In all cases hygienic measures to prevent chill and exposure are useful. It must not be forgotten that lumbago sometimes is due to aneurysm.—Plicque, *Presse méd.*, Paris, July 20, 1901.

THE TREATMENT OF OBESITY.

The first part of the paper is a clinical record of a case of alcoholic neuritis, which developed talipes equinovarus, for which she remained in a surgical clinique for twelve months. During this time she increased in weight from 140 to 290 lb., despite two courses of thyreoiodin treatment. On both occasions thyroid treatment had to be abandoned, owing to the appearance of sugar in the urine. The patient then came under Stadelmann's care, to be treated for her obesity. As a preliminary measure, Stadelmann determined the usual diet of the woman, and found that she was taking 100 grms. albumin, 50 grms. fat, and 160 grms. carbohydrates, representing about 1500 calories. This diet is by no means excessive, and yet the patient gained 6 lb. on it during three weeks. It was found that, with a diet containing 1200 calories, she still gained in weight, while not until the calories were reduced to 1000 did she begin to lose flesh. Therefore, for a period of a year, the patient was kept on a diet which represented less than 1000 calories. This was obtained by greatly diminishing the fat and carbohydrates, while albumin was freely given. In order to permit of quantity, green vegetables, containing little carbohydrates, were much used. Alcohol was not allowed, but otherwise no restrictions were placed on drinking. Though the case was complicated by the extreme adiposity and the remains of the neuritis precluding any exercise, still weight was lost at the rate of 3 lb. to 4 lb. weekly. Every six to eight weeks a halt for a fortnight was called, during which the patient received additional fat and carbohydrates, so that she did not lose weight during these periods. At the end of eleven months the patient had lost 120 lb. During the cure Stadelmann tried all the usual additional factors—as, thyreoiodin, hydrotherapy in its most diverse forms, vapour baths, massage, and electricity—but was unable to convince himself that any of these had any effect, though patients like having something fresh to try, and they do good by keeping the patient in good humour. When the patient took ordinary diet, thyreoiodin tablets caused glycosuria, but when on a strict diet they had no such effect. On the obesity thyreoiodin had no effect, though it caused unpleasant symptoms of giddiness, weakness, headache, and sleeplessness. The rest of the paper is taken up with a review of the common methods of treating obesity. Banting's cure consists in the consumption of large quantities of lean meat, with moderate carbohydrates, while fat is not allowed. It consists essentially in the limitation of fat, but even lean meat contains fat in fair amount. Stadelmann holds that cooked lean meat contains 5 per cent. fat, and so a patient undergoing Banting's cure can easily be taking 60 grms. of fat. This point is frequently forgotten. Ebstein improved Banting's diet, so that the patient gets moderate quantities of meat and fat, while carbohydrates are only given in small amounts. Ebstein's diet does very well for moderate obesity, but for excessive obesity, combined with inability to walk, Stadelmann diminished it in caloric value, by increasing the albumin and diminishing the fat. Stadelmann does not believe in rigid rules. Every cure consists in underfeeding the patient. It is more or less immaterial how this is done. Each case must be studied and individualised, and, according to the wishes and condition of the patients, individual cases must receive more fat, more carbohydrate, or more meat. Every antifat cure is a severe measure, and requires strict medical supervision. Excepting massage and exercise, the other therapeutic measures are of little use. Especially dangerous is thyroid medication. It is quite unnecessary. Stadelmann then discusses the question of fluids. He does not believe that excessive fluid ever causes heart mischief, and does not admit that limitation of fluid plays any part in treatment of obesity. He objects very strongly to Schweniger's method, who does allow his patients to drink with their meals, on the ground that, provided the patient does not take fluid with his meals, the digestive juices will cause the abstraction of water from the tissues. Now Schweniger thinks that this water will come from the fat cells, and in this way lead to the consumption of fat. There is no proof of this, and Stadelmann points out that his patient was allowed as much fluid as she cared for.—*Berl. klin. Wchnschr.*, 1901, No. 25.

DIAPHORESIS IN OSTEOMALACIA.

THE theories regarding the origin of osteomalacia are very numerous. It is often held to be due to the ovaries reflexly affecting the bones. Most authorities now agree that in osteomalacia there are changes in the intra- and periosteal circulation, pointing to inflammatory hyperæmic disturbances. In some obscure way these changes are connected with the bone mischief. Schmidt hoped, by causing intense hyperæmia of the superficial tissues, to relieve the congestion in the bones, and thus favourably affect the course of the disease. He tried hot air baths in two typical puerperal cases, with good results. In the first and slighter case the patient was much relieved, and within nine days an improvement in walking was noticed, while within a month the patient was almost well. The second patient was in a much more advanced state of the disease. She had been confined to bed for ten months, and had not improved under phosphorus. For three months patient received almost daily hot air baths, and made rapid progress, so that after three months she was able to walk, and in six months was able to undertake household duties. Schmidt considers that, in addition to relieving the tension, possibly the profuse sweating may do good by removing acids which may act on the bones. The baths should last for about an hour, and are best given in the evenings, as the lassitude which they cause favours sleep.—Schmidt, *Berl. klin. Wchnschr.*, 1901, No. 27.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

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CHRONIC FLUORINE POISONING.

SCHWYZER (*N. York Med. Journ.*, July 6, 1901) records the case of a patient, a journalist, æt. 38, who came under his care suffering from phlebitis of the leg. In making examinations of the blood, he noticed that it clotted very quickly, and was thus led to suspect the presence of some chemical disturbance. Careful blood analyses were made, and the ash proved the presence of the normal quantity of CaO, a deficiency of Cl, and a relatively large quantity of iron. On adding water to the ash of the incinerated dry residue, an intensely penetrating odour was noticed, which was identified as that of HFl. The dry residue was also found to corrode a nickel dish in which it was incinerated, while evaporation of the blood in a glass dish caused it to appear etched, thus likewise indicating the presence of fluorine. The amount of CaO excreted in the urine and fæces was increased. Fluorine was detected in the urine in the following manner:—"In 100 c.c. of urine 10 grs. of ammonium chloride were dissolved, and this mixture was allowed to stand for several weeks in a well-stoppered Erlenmeyer flask. Then the flask was emptied and rinsed with acid and alkali, in order to cleanse it from all deposits; the part of the flask that had not come in contact with the mixture showed a slight opaque etching; while in the part which had been in contact, the glass had become thinner."

The result of the author's clinical research into the case was as follows:—The presence of a uninuclear leucocytosis; (2) greatly increased excretion of lime in the fæces and urine; (3) great pain in the bones, as in osteomalacia; (4) increased coagulability of the blood, with a tendency to thrombosis.

As regards the source of the fluorine, this was suspected to be beer, of which the patient daily consumed large quantities (eight to ten bottles). The beer was submitted to a complete analysis, but the first researches were negative, as it was not recognised that fluorine combines with the glass of the bottle, forming fluorsilicum, which is precipitated on the inner surface of the bottle as a gelatinous substance. Subsequently the presence of fluorine was proved in the beer in the same manner as in the case of the urine.

The patient slowly recovered after the diagnosis of fluorine poisoning was arrived at, and suitable treatment prescribed. Schwyzer, in conclusion, points out that fluorine is capable of a cumulative action under certain conditions. "In small doses it is a relatively harmless preservative agent; but as soon as it is given a chance to accumulate in the body, through continued administration, it becomes dangerous, and its employment should be prohibited by law. This applies especially to beverages and food-stuffs that are consumed regularly and in large quantities, particularly beer, green vegetables, milk, and meat."

CARBON BISULPHIDE POISONING.

IN the *Berl. klin. Wchnschr.*, July 29, 1901, Mendel records two cases of chronic poisoning by carbon bisulphide amongst workmen of a cable factory who were exposed to the fumes given off from the so-called vulcanising fluid. Both patients suffered from atrophy of the regions supplied by the median, ulnar, and radial nerves, with partial degenerative reaction and weakness of the muscles supplied by the tibialis and peroneal nerves; while in one of the patients there was electrical change in the extensor brevis digitorum. The cases are peculiar, inasmuch as the upper and lower extremities were almost equally affected, while, apart from the degenerative atrophy of the muscles and resulting weakness, there was no sign of illness, except in one case a slight impairment in the sensibility of the foot.

THE VALUE OF PEROXIDE OF HYDROGEN, CHLORIDE OF COBALT ($CoCl_2$) AND FERROUS HYDRATE AS ANTIDOTES IN POISONING BY CYANIDE OF POTASSIUM.

MARTIN and O'Brien (*Intercolon. M. J. Australas.*, June 1901) carried out experiments upon the above subject at the request of the Department of Mines, and have embodied their results in a most interesting and valuable paper.

With regard to H_2O_2, which is recommended by Kobert, they found that it is of little value in the treatment of cyanide poisoning, for, while it does oxidise HCy and KCN, forming innocuous compounds, yet the action does not occur with sufficient rapidity to be of practical value. The experiments were conducted upon animals (rabbits), and it was found, in connection with all the above antidotes, that in no case was an animal saved after a fatal dose of HCy, when the interval between the administration of the poison and the antidote exceeded five minutes, so that no antidote, the value of which depends upon a reaction which is not instantaneous, is likely to be of service. With regard to the action of chloride of cobalt, it was found that, while cyanide of cobalt is insoluble in water, and is not decomposed to any extent by dilute hydrochloric acid, yet that unless the chloride of cobalt is added in excess a cobalto-cyanide of potassium is formed, which is poisonous, although much less so than KCN itself. In using $CoCl_2$ as an antidote, therefore, sufficient must be administered to convert all the KCN into insoluble cyanide of cobalt. Under these circumstances $CoCl_2$ proved a satisfactory antidote. A drawback, however, exists in regard to the use of salts of cobalt, namely, that they are themselves irritant poisons, and hence, if given in considerable excess so as quickly to counteract the effects of KCN, the balance of $CoCl_2$ remaining free in the stomach may produce toxic effects. As efficacious as cobalt salts were ferrous salts, administered along with sufficient alkali to overcome the acidity of the stomach. This latter precaution is essential, since it was found that otherwise no ferrocyanide was formed, and that for the reaction to take place the solution must be neutral or alkaline. There are two advantages connected with the use of ferrous salts, namely, the reaction is instantaneous at the body temperature, and the ferrocyanides are only slightly poisonous.

The authors conclude as follows: "We therefore think that in all mines and mining laboratories, where opportunities for accidental poisoning by cyanides occur, solutions of ferrous sulphate, weak potash, and a small packet of magnesium oxide, together with a stomach tube and suitable receptacle for mixing, should be kept ready prepared in some suitable position, so that they could be administered with only a few seconds delay.

"We would recommend that the following be prepared:—

"(1) 30 c.c. (1 oz.) of 23 per cent. solution of ferrous sulphate; (2) 30 c.c. (1 oz.) of 5 per cent. solution of caustic potash; (3) 2 grms. (30 grs.) of powdered magnesium oxide; (4) a metal receptacle of 1 pint capacity; (5) a stomach tube. Numbers 1 and 2 should be in hermetically sealed tubes, which can be broken into the receptacle, and powdered magnesia, and half a pint of water added, shaken up and administered."

I. THE DISTINCTION OF HUMAN FROM ANIMAL BLOOD BY MEANS OF THE CRYSTALLISATION OF THE HÆMOGLOBIN.—Moser, *Vrtljschr. f. gerichtl. Med.*, Berlin, 1901, Heft 3.

II. A METHOD OF DISTINGUISHING HUMAN FROM ANIMAL BLOOD, BASED UPON THE VARYING RESISTANCE OF THE HÆMOGLOBIN TO ALKALIES. —Ziemke, *Ibid.*

III. THE DISTINCTION OF HUMAN FROM ANIMAL BLOOD BY MEANS OF A SPECIFIC SERUM.—Ziemke, *Deutsche med. Wchnschr.*, Leipzig, 1901, No. 26.

MOSER (I.) discarded the usual methods of preparing hæmoglobin crystals, using only water and no chemical substance. The blood to be examined, fluid or clotted, was placed on a microscope slide, and allowed to dry until it merely presented a slightly moist appearance. It was then mixed with a little water, and the mass placed on a piece of linen, from which a drop or two of the fluid was squeezed on to a microscope slide. By this means, other substances, such as fibrin, which retard crystal formation, were kept back. The fluid on the slide was then allowed to dry slightly, and covered by a cover-glass, the edges of which were surrounded by shellac or wax, in order to prevent rapid evaporation. Blood kept under various conditions, and from various animals, was made the subject of investigation. The conclusions arrived are—(1) From fresh blood, from old blood in a fluid state, or still moist, as well as from recent dry blood stains, hæmoglobin crystals can be easily obtained. (2) The form of the hæmoglobin crystals of human blood differ so characteristically from those of animals, that it can be determined with absolute certainty, by this means, whether the blood under examination is human or animal.

Ziemke (II.) refers to the work of Körber, Preyer, and Krüger, in regard to the decomposing action of acid and alkaline solutions upon the hæmoglobin of different animals, as indicated by the disappearance of the bands of oxyhæmoglobin in the spectrum. Their observations showed very marked differences in the time required for this decomposition to take place, after the addition of 10 per cent. solution of caustic soda, or of 10 per cent. solution of acetic acid to human blood solutions, as compared with those of domestic animals. In 1898, Magnanimi attempted to elaborate a method based on this fact, by which human blood could be distinguished from that of different animals. Ziemke's investigations were undertaken with the object of verifying the observation that a difference in the resistance of the hæmoglobin of different animals towards alkalies does actually exist; and, secondly, in order to simplify Magnanimi's method of procedure, and at the same time determine whether the same differences of resistance existed in old, dried blood, and in blood-stains upon fabrics, etc. With these objects in view, a large number of observations was made upon human blood taken from healthy persons, and of those suffering from various diseases, and from the dead body, as well as upon the blood of the domestic animals in different states and conditions. In order to obtain blood solutions of equal hæmoglobin strength, Ziemke used Hüfner's spectrophotometer, but as this is a somewhat difficult instrument to work, and not always available, he recommends the strength of the blood solutions to be standardised by the calorimetric method, with a test solution prepared from a solution of cerium and picric acid. The results obtained indicate that there is a marked and constant difference between human blood and that of other animals as regards the resistance of hæmoglobin to the action of alkalies; human blood being decomposed in a much shorter period of time. This difference holds good not only in the case of fresh blood but also in old dried blood, and in blood stains, so long as hæmoglobin or methæmoglobin is present. When the change into hæmatin has taken place, the method is no longer applicable, since hæmatin cannot be transformed into oxyhæmoglobin.

In III. Ziemke has submitted to further investigation the method of distinction of human blood from that of other animals proposed by Wassermann and Schütze, to which reference was made in this Journal, vol. i. 1901, p. 593. The results obtained tend to substantiate the great value and importance of this test as a means of identifying human blood, when present under various conditions of age, exposure, and treatment.

THE POST-MORTEM APPEARANCES IN DEATH BY STRANGULATION AND IN HANGING.

DR. FRITZ REUTER (*Ztschr. f. Heilk.*, Berlin, Bd. xxii. Heft 4) has carefully tabulated the post-mortem appearances found in cases of strangulation (nineteen) and hanging (200), which occurred in Vienna during the years 1875–1900. The whole paper is of very considerable interest to those engaged in medico-legal work. Apart from differences in the appearance and position of the constriction mark, the following are the chief post-mortem features of the two modes of death:—

A. EXTERNAL.

Strangulation.	*Hanging.*
1. Cyanosis of the face with ecchymoses of the eyelids and connective tissues is the rule.	1. Cyanosis of the face is usually not present. Ecchymoses present in 20 per cent. of cases where the constriction mark is in the typical position, and in ·30 per cent. of cases where it is atypical.

B. INTERNAL.

Strangulation.	*Hanging.*
2. Outer coverings of skull, brain, and its membranes always congested.	2. Fulness of vessels of the head varies, and as a rule represents their state at the moment when the circulation ceased.
3. Hæmorrhages in the soft parts of the neck are the rule especially in the muscles.	3. Hæmorrhages in the muscles are rare; 2 per cent. in typical and 12 per cent. in atypical positions of the constricting band.
4. Injuries of the larynx and hyoid bone occur seldom.	4. Injuries of the larynx and hyoid bone, in the form of fractures of the cornua, are common; 60 per cent. in typical and 30 per cent. in atypical positions of the constricting band.
5. Ruptures of the intima of the carotid arteries were not observed, merely extravasation in the adventitia in three cases.	5. Rupture of the intima of the carotids occurs in 5 per cent. of typical and in 4 per cent. of atypical positions of the constricting band.

DERMATOLOGY.

UNDER THE CHARGE OF

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Malignant and Severe Syphilis.

Lochte (*Monatsh. f. prakt. Dermat.*, Hamburg, 1901, Bd. xxxii. Nos. 10, 11, 12) has made an exhaustive analysis of 3270 cases of syphilis in men, occurring in the Skin and Venereal Department of the Hamburg General Hospital, under Engel-Reimers. In these, seventeen instances of malignant syphilis were met with. No examples were found in women, and in them it is certainly less frequent. Most were seafaring men. Common to all was the early appearance of numerous ulcerations over the whole body. A second point was a marked diminution in physical strength, with emaciation and loss of appetite. A third characteristic displayed itself as soon as treatment was commenced, in the remarkable inefficacy of mercury. Severe syphilis approximates to these, by its localisation in vital organs, by complications with other diseased conditions, or in the manifestations and course. Viewed in this way, the conception of "galloping syphilis" is more readily grasped. The origin of the ulceration was always to be found in a papule, which usually became a pustule, and beneath the crust so arising the ulcer formed. Or a continually thickening and peripherally extending crust formed, constituting rupia; under it also an ulcer arose. Or the papule increased as a livid, tumid infiltration, not unlike erythema nodosum, which by central necrosis became an ulcer. Mixed forms were met with. At the same time the eruptions of the early periods may be simultaneous with rupia and ecthyma, while macular and papular efflorescences may succeed in time the ulcerating ones. In numerous cases the marked general adenomathy was absent. The powerlessness of mercury could often be contrasted with the value of iodide; but occasionally both failed, and then recourse was had to a tonic and strengthening diet and regimen. Though useless in many, in two, iodothyrin gave brilliant results. Turning to the causes of malignity and severity, the effect of alcohol was investigated. In the case of prostitutes this is discounted by the fact that they usually acquire syphilis in the first two years, before the injurious influence of alcohol has had time to manifest itself, for the young prostitutes are not drunkards, though they may become so later. There is no doubt, however, that alcohol renders its course abnormal and severe, the chancre exhibits a greater tendency to break down, the eruptions are extensive, often pustular, and there is liability to hæmorrhages, while in the tertiary era the liver is most frequently diseased. As regards tuberculosis, in the phthisical the manifestations in the early period are worse, and the eruption is apt to assume the small papular type. At this time the patients are in more danger from the phthisis than the syphilis; if superadded to syphilis later, it does not aggravate it. Malaria of some years back and recovered from, appears to exert no prejudicial effect. It is otherwise should they be consentaneous; then its intensifying power is unmistakable. Syphilis contracted from individuals of a different and especially an Eastern race, is particularly prone to take on the malignant form. This has been long known, and recent observations serve but to confirm this. As Lang observes, "There is nothing that the European in the East has to dread more than the infection of syphilis." When acquired in advanced age, the primary lesions develop more slowly, and show less tendency to heal. The eruptive phenomena are severe, often accompanied by fever; roseola is rare, the papulo-squamous forms more common. Gummata appear early and constantly recur; disturbances of the central nervous system are specially apt to assert themselves. Anæmia and cachexia are always very prominent. Occasionally exceptionally severe forms of syphilis develop in pregnant women. Neither syphilis maligna nor gravis regularly follows any of the above-mentioned aggravating conditions. Cases are related to disprove the view that a hereditarily acquired immunisation protects. It is possible that the various grades of susceptibility in races and individuals correspond to chemical differences in the blood and tissue-juices, as has been proved in a series of bacterial diseases. The explanation does not lie in an idiosyncrasy of the organism.

The Linear Dermatoses.

Some skin affections assume a linear arrangement. At one time, according to Balzer and Alquier (*Arch. gén. de méd.*, Paris, June 1901), we recognise the characters of eczema, of psoriasis, or of lichen, at another —such are evidently congenital—are nævi or ichthyosis in lines. Frequently the diagnosis remains hesitating or disputable. This linear arrangement again is not apparently merely a chance freak, but the result of a predisposition, which is supported by the habitual tenacity and the tendency to chronicity commonly exhibited. No one theory of their causation can actually embrace all the facts, but the theory of an embryonic malformation following the lines of Voigt, enables us to understand the wherefore of the linear distribution. Frequently, it is true, the eruption is more or less distant from Voigt's lines, but parallel to their direction;—here to the faulty development there may be added a topographical anomaly of these lines, consequent on the abnormal development of the different dermatomères. The vicious development may originate a linear locus minoris resistentiæ, on which various cutaneous diseases find a favourable soil. They are thus really only late nævi. Further researches in this direction are needed to solve the question.

Domestic Dermatophobia.

Apprehensions (*les phobies*) are insufficiently grounded morbid misgivings, or at least such as are not justified by the actual pathological phenomena. The group is as varying as man himself, and the nature of the alarms changes in accordance with the epoch and the environment of the patients, with their education, and with the often trivial incidents which give rise to them. Widely as these are diffused throughout all the domains of pathology, and owning for the most part a neuropathological basis, yet the public hold to the belief that each has an organic substratum, and the opinion of the physician who expresses this view will prevail against that of many others who regard the complaints as imaginary. Like numerous psychical ailments, these alarms are sometimes contagious, an affected individual may induce others round her to suppose that they too are similarly infected; she sees on them the same appearances which she thinks she beholds on herself, and persuades them that they have the same symptoms. She may even hint to them of feelings which she herself does not experience, and we know that many end by fancying themselves ill simply because they are told that they do not look well. Pruritus is very readily produced by suggestion; some persons are impelled to scratch whenever they hear itching or lice mentioned. Urticaria may arise in this way; hence it is not surprising that pruritus is one of the commonest manifestations of dermatophobie. Dubreuilh and Maillard (*Mém. et bull. Soc. de méd. et chir. de Bordeaux*, April 1901) relate a very interesting case illustrative of these remarks. A boy of 16, after sleeping away from his home, commenced to complain of itching, and a month later his brother, æt. 9, who occupied the same bed, also began to scratch, and from thence onward all the members of the family were similarly affected. It seems likely that the disease, in the first instance, was scabies, and the earliest attacked was treated with sulphur, ceased to live with his family, and was cured. But those subsequently suffering exhibited, when examined by these skilled observers, no trace of scabies nor of other parasites. They hold that the whole phenomena were due to suggestion emanating from the grandmother, a woman of strong character and imperious will, who ruled the entire household, who for a time slept with the younger boy, and fancied she had contracted disease from him.

SOME TRADE ULCERATIONS ON THE HANDS.

AMONG the numerous trade eruptions there is one of a peculiar character seen in tanners and leather-dyers, to which Brocq and Laubry have (*Ann. de dermat. et de syph.*, Paris, April 1901) drawn attention. It has been known for some time, since in 1853 Armieux published an account of it, and Tardieu, Bazin, and others have alluded to it. In those employed in washing skins and removing the pelt, the situation is specially the point of the fingers. In dyers, again, the place of election is the dorsal aspect of the metacarpo-phalangeal articulation of the thumb of the left hand, but it also is found on the back of other fingers in the neighbourhood of the joints. So long as the horny epidermis remains intact, the dyers do not suffer. Should, however, any fissure or excoriation arise in consequence of cold or prolonged soaking in water, the caustic substances which they handle commence to exercise their destructive action on the tissues. In these circumstances an ulcer forms, generally oval in shape, from 3 mm. to 1 cm. long by 3 to 6 cms. broad. The ulcer is sharply cut, as by a punch, 2 to 4 mm. deep. The margin presents a raised edge, red or rose coloured, frequently having outside it a separation of the epidermis forming a collarette. The skin round is in some cases red and swollen. Often when seen the ulcer is covered with a black crust, firmly embedded. This imparts a species of resemblance to the eye of a bird, hence the work-people attach slang names to the lesions, as nightingale, pigeon, etc. Pain is most intense when the tip of the finger is the seat; in other situations it is described as burning, itching, or darting. So long as the work is persevered in the ulcers cannot heal, and tend to advance in depth, so as even to reach the periosteum. The nails similarly may be attacked, the matrix especially, ending in indelible disfigurement, with retraction of the back of the finger. Not only the substances employed to free the skins of the hair, as lime and orpiment, but the mordants used in dyeing, seem the exciting causes. Thus acids and caustics, particularly picric acid, chromates of potass, and chlorides all contribute to occasion the condition. In diagnosis, arsenical ulcerations are indistinguishable from this trade one, as being, like it, simple ulcerations due to the slow and progressive action of caustics. In treatment it is essential that the employment be intermitted. If there are crusts then these must be made to separate by a wet dressing, afterwards cicatrisation is to be favoured by the application of various powders, if pain orthoform, if a tendency to eczema sub-carbonate of iron or iodol. In prophylaxis great attention should be paid to any imperfection of the epidermis, while the strength of the mordants used should be reduced, it having been noticed that the prevalence of the complaint is in direct ratio with the strength of the mordant. Brocq and Laubry reject the view that the ulcers were due to lime, but Hall (*Brit. Journ. Dermat.*, London, June 1901) records an instance where an analogous condition arose from the slow caustic action of lime powder. A man of 66, employed in polishing electroplate on a revolving wheel charged with finely powdered lime mixed with a little olive oil, which adheres closely to the skin when deposited on it. Though long accustomed to the work, he had only recently suffered from irritating effects. His hands became chapped, and in the fissures so occurring the lime got implanted, and there meeting with serous exudation, produced a weak caustic paste, eventually originating an ulcer. He was cured by thoroughly cleansing his hands, then covering each ulcer with antiseptic gauze and collodion before going to work. The appearance of the ulcers were very similar in both cases.

INFANTILE DISSEMINATED GANGRENE OF THE SKIN.

THIS, like noma, once common, is now a rare complaint. Veillon and Hallé (*Ann. de dermat. et de syph.*, Paris, May 1901) have, however, had the opportunity of studying a case with the aid of the new bacteriological methods. A healthy infant of 18 months, four days after the appearance of the eruption of measles, developed blisters on the neck, filled with a sanguinolent fluid. These soon became punched out, oval ulcers implicating the entire depth of the skin, with a livid red margin and containing a putrid slough. One of these extended into a large gangrenous cavity. There were also scattered over the body small impetiginous pustules and larger abscesses containing laudable pus. The child died from exhaustion. From the pustules and most of the abscesses only the *Staphylococcus aureus* was cultivated, but from one over the sternum and from the pus from the gangrenous area on the neck an anærobic bacillus was obtained, in size resembling the long forms of that of diphtheria, but assuming irregular shapes, while some of the rods branched, and were identifiable with the *Bacillus ramosus.* A few streptococci were likewise isolated. While not asserting that this bacillus is that peculiar to disseminated gangrene, they remark that in this instance wherever the lesion was an ordinary one only a common organism, the staphylococcus was present, but where specific or gangrenous, then there was a special microbe, the *B. ramosus.*

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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A STUDY OF THE PLANTAR REFLEX IN CHILDREN.

THE series of investigations described in this paper by Morse were undertaken for the purpose of ascertaining—(1) whether or not the plantar reflex is present in infancy; (2) if present, its character; (3) if absent, at what age it is developed. Incidentally it was hoped that something might be learned as to the value of the Babinski phenomenon in the diagnosis of the nervous diseases of infancy. Two hundred and fifty-four consecutive infants under 2 years, not suffering from any nervous disease, were examined. The conclusions of the few observers who have studied the plantar reflex in infancy are at variance on the subject.

Babinski found that in new-born babies irritation of the sole of the foot normally caused extension of the toes, which he attributed to the imperfect development of the pyramidal tracts at birth, and considered it as proof of the dependence of the toe phenomenon upon disturbance of the functions of the pyramidal tract.

The author used a moderately sharply pointed stick to test the plantar reflex. It was drawn, not too rapidly or too forcibly, from the heel towards the toes, along the outer side and middle of the foot. Each foot was always tested several times, to avoid error. The flexion of all or some of the toes was accepted as the flexor reflex. The extensor reflex was limited to deliberately marked extension of the great toe, with or without extension or separation of the other toes. Especial care was taken not to accept dorsal flexion of the foot as the extensor reflex. Great difficulty was experienced in many cases in determining the presence or absence of a reflex, because of the tendency of infants to hold their feet rigidly in extension or flexion. It is very difficult to get the feet relaxed enough for a satisfactory examination.

In 35 per cent. of the cases there was no plantar reflex; in 7 per cent., no reflex on one side, and flexion on the other; in 6 per cent., no reflex on one side, and extension on the other; in 5 per cent., flexion on one side, and extension on the other; in 25½ per cent., flexion on both sides; and in 21½ per cent., extension on both sides. Further analysis shows that the reflex was absent on both sides much more often in the first than in the second year, and much more frequently in the first nine than in the last three months of the first year. It also shows that extension on both sides was much more frequent than flexion during the first nine months, while the condition was reversed after this age. Dorsal flexion of the feet and marked drawing up of the legs were not uncommon reactions during the first year, and occurred but rarely in the second year. From the results of his investigations the author concludes that there is no constant plantar reflex in the first year, and that while the reflex approaches the adult type during the second year it is still inconstant. It is also evident that since there is no constant reflex under normal conditions during the first two years, no conclusions can be drawn from the peculiar absence or character of the reflex in the diagnosis of abnormal conditions of the nervous system at this age. Further observations are necessary to show at what age the normal reflex is established. It is undoubtedly later than the second year.—*Pediatrics*, 1901, vol. xi. No. 1.

VULVO-VAGINITIS IN CHILDREN.

IN the *N. York Med. Journ.* for August 1900, Sheffield writes an interesting contribution on this subject. He describes three varieties of this affection. (1) Catarrhal vulvo-vaginitis, which is caused either by want of cleanliness or by chemical irritation; (2) a traumatic variety due to masturbation, mechanical injury, or violence; and (3) a parasitic condition, caused by oxyuris, saprophytes, or pathogenic bacteria, especially the gonococcus. Saprophytic organisms are responsible for a great many of the cases met with. To them is attributable the vaginitis so often encountered after the acute exanthemata, and also that occurring in strumous children affected with purulent discharges from the nose or ears. Those varieties would be much commoner than they are, were it not for the antagonistic action of the bacillus which normally inhabits the vagina, and which during its growth produces lactic acid, in the presence of which the streptococcus and staphylococcus are unable to develop. Gonococci do not yield so promptly to the destructive effect of the vagina bacillus, but, owing to the hard and horny condition of the superficial layer of squamous epithelium lining the vagina, considerable resistance is offered to their entrance. The vagina is frequently affected secondarily to the urethra, which, being lined with a delicate columnar epithelium, gives a readier access to the gonococcus.

The author emphasises the importance of careful microscopic examination of the discharge in every case of vulvo-vaginitis, and, upon the detection of gonococci, the necessity of strict isolation and perfect cleanliness. For the arrest of the vaginal discharge he considers a protargol solution as the best remedy in every variety of vaginitis. In gonorrhœal vaginitis he uses a 2 per cent. solution, and in all other forms a solution of half this strength. When the mucous membrane is very sensitive, a weaker solution may be used at first. The child is placed in the dorsal position, and the legs are widely separated. The exuding pus is wiped away with absorbent cotton, after which a 5 per cent. solution of sodium carbonate is slowly and repeatedly injected into the vagina by means of a glass syringe holding half an ounce, until the pus is completely removed. This is followed by the injection, through a soft rubber catheter, of several syringefuls of the protargol solution, which is allowed to remain in the vagina about five minutes, by bringing the labia close together. This process is repeated five times in the twenty-four hours. When the urethra is implicated, crayons containing a grain each of protargol and iodoform are passed into the urethra night and morning. No irritation follows this method of treatment, and it is usual to find the gonococci and most of the discharge disappear in about nine or ten days. The strength of the protargol solution is then gradually diminished. To prevent gonorrhœal ophthalmia, he recommends the application of a well-fitting vulvar pad, applied by means of a T-bandage, and changed thrice daily. At the same time a few drops of a half per cent. protargol solution are instilled into the eyes. He believes that the occurrence of gonorrhœal peritonitis is often caused by the vaginal discharge being forced into the uterus and Fallopian tubes during the process of douching. This he considers can be prevented by discarding the douche, or, if it is used, by hanging it not higher than a couple of feet above the level of the child's body.

TYPHOID FEVER IN INFANCY AND CHILDHOOD.

IN this paper Griffiths draws attention to the variation of symptoms in childhood from those in adult cases. To insist that the cardinal symptoms must always be present in early life would lead us into frequent failures to make a diagnosis. It was principally to this tendency that typhoid fever occurring during infancy was formerly frequently overlooked. Two methods of onset are characteristic of typhoid fever in early life. In the first, the peculiarity is the indefiniteness. The great degree of fatigue and malaise, so typical of the onset in the adult, is usually absent in childhood. The "walking-typhoid" of adult life is the rule in children, and the only symptoms are slight indisposition, headache, and some loss of appetite. The physician is generally the first to discover that there is fever, and as this continues for several days, during which time the child scarcely feels ill, suspicions are aroused. and the diagnosis of typhoid is arrived at principally by a process of exclusion. The second form of onset is characterised by its suddenness. The child is seized with vomiting, and has decided fever, and, after two days of high temperature and malaise, rose-coloured spots make their appearance. In infants both the earlier and later symptoms are most vague, especially as at this time of life elevation of temperature is so common, from undiscovered causes. Here the diagnosis is very difficult even after the disease is well established, and very frequently only the serum reaction will distinguish the case from enteritis, indigestion, or influenza.

In children the duration of the disease is, as a rule, distinctly shortened, lasting on the average about seventeen days. Abortive attacks lasting about a week or a trifle more are common. The whole course of the illness is also much milder than in adult life. This is borne out by the mortality statistics, which show that only about 3 per cent. of children attacked by typhoid die. Children are less liable to die under 5 years than above that age. Typhoid roseola appear to be nearly or quite as frequently present as in adult life. Enlargement of the spleen is nearly always present, and can be discovered, if sought for at the proper time, when the abdomen is not too greatly distended. The temperature is subject to much greater variations than in adult life. Not unfrequently it rises rapidly without the usual step-like ascent, and it often falls towards the end of the attack with much greater rapidity than in adults. Indeed, the fall may be almost critical at times, and it is very seldom that we meet the remittent temperature during the last part of the fever so usual in adult typhoid. Vomiting is a common initial symptom, and even later in the disease it is sometimes troublesome. Diarrhœa is much more frequently absent than present, and abdominal distension is not, as a rule, a prominent symptom; and tenderness is seldom met with, which is in sharp contrast to the manifestations in the adult disease. Hæmorrhage and perforation occur but rarely, and when they do take place it is nearly always in children of over 9 or 10 years of age. The infrequency of these symptoms is doubtless due to the much less pronounced development of the intestinal lesions. The nervous symptoms in children predominate over the intestinal, but this by no means implies that they are more severe or more common than in adults. A condition not infrequently seen at the beginning, and liable to cause confusion in diagnosis, is that of pseudo-meningitis.—*Journ. Am. Med. Ass.*, Chicago, August 17, 1901.

ANALYTICAL REPORTS.

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Esvach Water.

(Davy, Hill & Son, Yates & Hicks, Southwark, London, S.E.)

In the *Edinburgh Medical Journal* for August 1899 various details were given as to the properties and characters of this aperient water; details which, we notice, have been largely utilised by the firm supplying it for the purpose of indicating its analytical composition and nature. We have little more to add at this time in noticing a further sample of the preparation forwarded us, except to again credit it with being a most pleasant form of aperient water, and acting satisfactorily. The chief feature of Esvach water lies in the relatively large proportion of bicarbonate of sodium compared with the saline sulphates, conferring a slightly alkaline reaction on it, often a matter of some weight. It also is innocent of any contamination with salts of calcium. Given in doses of 2 oz. or more, as required—2 oz. containing, as shown on the former occasion, 37·4 grs. of the sulphates of magnesium, sodium, and potassium, 9·3 grs. of sodium bicarbonate—it acts *cito, tuto, et jucunde.*

Eau de Menthe.

(A. S. Hill & Son, London.)

Samples of "L'Excellente Eau de Menthe Pectorale de Dalmahoy" have been sent us by Messrs. Hill & Son. The bottles containing the peppermint water are charged with a label, writ in the French language, and bearing that "a glass of this water, taken during the course of the day, gives strength to the body, stimulates the stomach, improves the appetite, facilitates digestion, increases vivacity, and inspires the feeling of well-being proper to members of both sexes."

This seems a "large order" for peppermint water; and an order more suited for the nation using the language on the label, than for the people of this country, less fond of "Vins Asperitif et des Autres," for hastening digestion, or even for courting vivacity.

Should they, however, be martyrs to flatulence, from over-eating, from improper feeding, and suffer from the despondency and lack of "go" attendant thereon, a glass of this "Excellente Eau de Menthe Pectorale de Dalmahoy" may relieve them of their burden; at any rate, it can do them no harm.

In reality, it is a very pleasant form in which to employ a useful carminative; it has a clean peppermint flavour, but not the raw, naked taste of ordinary "Eau de Menthe"; in fact, a "bouquet" of its own. It may well be chosen medicinally in place of "L'Eau de Menthe Ordinaire."

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

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METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FIVE WEEKS ENDING AUGUST 24, 1901; AND FOR THE YEAR FROM JANUARY 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	56°·5	[1] 410° [2] 1692°	0° 612°	2·9	19·1	137	984	2°·6
Observed	58°·5	[1] 462° [2] 1808°	0° 657°	2·6	17·2	171	§1123	2°·8
Difference	+2°·0	[1] + 52° [2] +116°	±0° +45°	−0·3	−1·9	+34	+139	+0°·2

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH, DUNDEE, ABERDEEN, AND LEITH), DURING AUGUST, AND SINCE JANUARY 1, 1901. Actual Numbers and Rate per 10,000 per annum.

		Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1]	1032	174·2	215	36·5	93	15·7	128	21·6	126	21·1
	[2]	9288	195·8	1878	40·1	883	18·6	1754	36·8	1069	21·2
Actual Deaths and Rate per 10,000	[1]	1049	176·9	227	38·6	100	16·9	78	13·1	125	21·0
	[2]	9339	196·8	1954	41·4	929	19·5	1505	31·7	1058	21·1
Difference from Mean	[1]	+ 17	+2·7	+12	+2·1	+ 7	+1·2	−50	−8·4	− 1	−0·1
	[2]	+ 51	+1·0	+76	+1·3	+46	+0·9	−249	−5·1	−11	−0·1

		Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
		No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1]	102	17·1	29	4·8	55	9·4	101	17·0	53	8·9
	[2]	612	12·7	243	5·1	701	14·9	946	19·8	413	8·56
Actual Deaths and Rate per 10,000	[1]	113	19·0	22	3·7	49	8·3	90	15·1	71	11·9
	[2]	681	14·2	268	5·5	712	15·1	841	17·7	506	10·6
Difference from Mean	[1]	+11	+1·9	− 7	−1·1	− 6	−1·1	−11	−1·9	+18	+3·0
	[2]	+69	+1·5	+25	+0·4	+11	+0·2	−105	−2·1	+93	+2·04

* Note.—The figures [1] denotes the data for August, [2] for year to date.

§ *Correction*.—Value for July should have read 952 in place of 592.

The four months ending August 24, 1901, were therefore much warmer than usual, with a large increase in hours of bright sunshine, 24·8 per cent. over the average, a rainfall closely approximating to the mean, and a mean variability of temperature above the same.

The values for the first eight months of 1901 indicate a very considerable excess of warmth, as shown in the number of day degrees over 40° recorded, which at the end of the period, equal to 6·8 per cent., exceeded the increase of those below 40° by 71°. The rainfall is lower; the sum of all the hours of bright sunshine experienced remarkably increased—by 14·1 per cent.

As was the case during the preceding three months of fine weather, the death-rate of the four towns was above that calculated. Diseases of the digestive system and cancerous lesions were chiefly to blame for this, the first yielding an excess of 10·7 per cent. over the average, the second of 33·9 per cent. *Per contra*, respiratory diseases were the cause of remarkably few deaths, as also phthisis, 3·9 per cent. and 10·8 per cent. respectively. Influenza was blamed for two deaths. The figures for the eight months show a moderate increase in deaths from all causes; relatively enormous under cancer, 22·5 per cent.; a decrease relatively large under the respiratory causes, equal to 14 per cent. Deaths from phthisis also are much below the usual average.

August, therefore, notwithstanding its very favourable weather, especially in regard to the hours of bright sunshine experienced during it, shows an increased death-rate, with a large excess of deaths from digestive and cancerous causes; but a most striking decrease of deaths from respiratory diseases.

The year to date—warm, sunny, and rather dry—corresponds very closely in its recorded data to the values for August. The most prominent feature is to be found in the extraordinary and almost constant increase month by month, and still more year by year, in the proportion of deaths due to cancer in its various forms.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

METHODS OF WORK.[1]

By G. A. GIBSON, M.D., D.Sc., F.R.C.P. Ed., *Physician to the Royal Infirmary and Lecturer on Medicine in the Medical School of the Royal Colleges, Edinburgh.*

IT seems to me that this session a departure from my usual custom as regards the opening day may be not only permissible but indeed advisable. Feeling that even the whole of a long winter term is all too short for the Science and Art, or, as we are more commonly in the habit of putting it, the Principles and Practice of Medicine, the first lecture has almost invariably been devoted to the real commencement of the work of the session. But on this occasion you will allow me to address you with some words of a more general character.

There are abundant reasons for such a course. We are still upon the threshold of a new century, although you have during the last few months no doubt heard this so often that you may already think it old. Such a limit of time is purely arbitrary, yet it has become so thoroughly rooted in the thoughts of mankind that we must regard it as a useful convention. Like many another arbitrary limit of time, it is of use by affording us an opportunity of looking back and looking forward.

When we turn our eyes backwards upon the century which has so recently closed, we cannot fail to be struck by the fact of its having been above all else an era of progress. The spirit of advance has been seen in every branch of human knowledge, but perhaps most of all in that to which we have devoted ourselves. It were tedious to attempt even a short summary of the vast additions to the various departments of medical knowledge, and no such attempt is necessary. You are all familiar with the main features of the medical advances of the nineteenth century.

In the middle of last century, Goodsir was in the habit of saying that in the early days of modern science those who laboured in its fields might be likened to reapers, those who followed at a later period could only be regarded as gleaners, while he and his contemporaries were to be fitly compared to the geese who picked up what was left on the stubble. But since the period in which this statement was made there has been vast progress in every department of the medical sciences. It is probable that Goodsir was only thinking of Anatomy when he uttered it, yet even in that subject—the oldest of the handmaidens of medicine, and therefore the most elaborated—important additions have been made. Witness the topography and structure of the brain, on which some of our mutual friends have made their mark so deeply. And when we turn from this eldest sister to the younger members of the family of Medical Science—Physiology, Pathology, Bacteriology, Pharmacology, and the rest of them—we are not merely astonished by the conquest of facts, but we are entranced by the vistas of possible conquests in the future which are opened up to our imagination.

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[1] An Introductory Address at Minto House, Edinburgh, 15th October 1901.

While we stand in admiration of the advances we see on every hand, we cannot but remember that they involve much harder labour for those who tread the paths of medicine. The accumulation of knowledge and the diffusion of speculation render the general mass of information, which it is necessary for us to acquire, more and more weighty every year, and the palimpsest of the brain, as De Quincey [1] termed it, must be graven with an ever increasing burden.

Face to face with such facts, it will be clear to every one that our vocation is no flowery way or primrose path. No, it must be, nay it is, one of strenuous endeavour. Not by sitting with folded hands can we ever enter the temple of knowledge. The mental condition depicted in the poet's beautiful "Choric Song" will not lead us far within it: [2]—

> "Let us swear an oath and keep it with an equal mind,
> In the hollow Lotos-land to live and lie reclined
> On the hills like gods together, careless of mankind."

Such, in the chaste word-mosaic of our late Laureate, is the mind of the wanderers after tasting the enchanted fruit. But this, it need not be insisted, were a fatal state for us. Hard, honest work was never more needful in the whole history of the world than it is now. Yes, instead of the dreamy languor of the "mild-eyed melancholy Lotos-eaters," we should assuredly strive to maintain the attitude of mind denoted by the lines of one who has been a source of refreshing to every age since the revival of letters: [3]—

> "Quocirca vivite fortes
> Fortiaque adversis opponite pectora rebus."

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[1] De Quincey, "Suspiria de Profundis."
[2] Tennyson, "The Lotos-Eaters."
[3] Horace, "Satires," book II. Sat. ii.

These remarks have been made on the assumption that the mind of every one of you has been made up as to the necessity of work. The youth's choice, if we may call it so, has been a favourite subject for the painter in every age. The earliest known picture of Raphael, and one of his greatest masterpieces, represents a young knight asleep below a laurel tree, the emblem of honour. A fair girl, beautifully attired, stands by, offering him a myrtle flower, the significance of which needs no comment; while another damsel, with grave mien and simple raiment, bends over him from the other side, offering a sword with her right hand and a book with her left—power and knowledge to aid him in the battle of life. From the clean-cut features and the well-knit limbs of the young knight it is not difficult to divine what will be his choice.

To return—the age we live in is above all an epoch of work. Evidences of this are to be seen on every side. The varied triumphs of the last century, which though dead yet speaks to us, could not have been achieved without labour. Sometimes a new light is vouchsafed, or a fresh fact is attained by a flash of genius; much more often, however, such advances are the result of long-continued exertion; and genius may then be held, as it has been put, to be the faculty of taking infinite pains.

But we do not only see proofs of this tireless industry around us; some of the greatest writers of the age have consecrated many of their pages to the importance of work. To three of these you will allow me to direct your attention very briefly. Our fellow-countryman Carlyle has given us, in one of his most picturesque books, glowing descriptions of the work done in the olden times by a mitred abbot of the Church, and has shown how in his view the methods of the old ecclesiastic should be applied in our own days. His hope for the future lies in governments that will guide, a working aristocracy, the nobleness of labour, and captains of industry. "For there is a perennial nobleness, and even sacredness in Work." "The latest Gospel in this world is, Know thy Work and do it." "Blessed is he who has found his work; let him ask no other blessedness." "Labour is Life: from the inmost heart of the Worker rises his god-given Force, the sacred celestial Life-essence breathed into him by Almighty God; from his inmost heart awakens him to all nobleness,—to all knowledge, 'self-knowledge,' and much else, so soon as Work fitly begins."[1] These are but a few of the truths which may be brought before you, by way of illustrating the views of this great writer.

Tolstoy, certainly one of the most striking personalities in the world of letters of our time, is also never weary of insisting on the necessity of labour, and in one of his most recent works he urges a return to the state of society amongst the early Christians. The retention by the labourer of such results alone of his labour as he can use, and the yielding of all superfluous products of industry to the common good, is, according to him, the only true principle of human life. "Work, brother! Work is happiness." Such is the burden of his theme.[1]

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[1] "Past and Present," book III. chap. xi.

Zola devotes his latest tale to the subject of work. In this remarkable volume, carefully conceived and minutely elaborated, like a pre-Raphaelite painting, the author preaches the doctrines of Fourier the collectivist. His hero, Luc Froment, a relative of the clergyman who figures throughout the series of the Three Cities—Lourdes, Rome, Paris—and engaged in an industrial vocation, is struck by the sights which he sees in a busy centre of production. The hatred for work shown by the labourers, their debased lives and brutal pleasures; above all, the degradation of their wives and sisters—these facts pierce his heart and render him, one night in a friend's house, absolutely sleepless. Rising from his bed he glances at the bookcase in his chamber, and sees the whole array of the collectivist authors—Fourier, Saint-Simon, Comte, Proudhon, Cabet, Leroux, and many others. Taking down one of these, a little volume by one of Fourier's disciples, entitled "Solidarité," he reads it with care, and, fascinated by its teaching, makes up his mind at once to strive for the furtherance of its doctrines. How the hero of the story succeeds in building up an association on these principles, how it flourished in contrast to a neighbouring town belonging to a capitalist, cannot be detailed here. "Et c'était le travail roi, le travail seul guide, seul maître et seul dieu, d'une noblesse souveraine, ayant racheté l'humanité qui se mourait de mensonge et d'injustice, la rendant enfin à la vigueur, à la joie de vivre, à l'amour et à la beauté."[2]

Thus these three great writers, starting from very different points of departure, and travelling along widely diverse paths, arrive at the same end—the necessity and the happiness of work. From the silent moors of Scotland, from the lonely steppes of Russia, and from the gay boulevards of France, we hear the echo of a similar strain.

However widely we may differ on matters of principle from many of the views on social subjects which they teach, we shall all doubtless agree with the contention of these writers in respect of the necessity of work, and we have all certainly found a real pleasure in its accomplishment. Each task we overtake, every goal we reach, renders further endeavour more easy, and future achievement more complete. It will be my duty, as it will be that of the other teachers whom you may elect to follow, to show you the example, so far as strength permits, of unstinted exertion. And from my experience of the students of medicine in the Grey Metropolis of the north, there can be no doubt that you will not only follow our lead, but by your generous emulation will stimulate us to fresh endeavours.

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[1] "Work whilst ye have the Light," chap. x.

[2] "Travail," livre III. chap. v.

One of the most important subjects which must demand our attention is to determine the limits of useful work. We are surrounded by problems of life on every side, some soluble, others insoluble. We can peer into the darkness surrounding certain of these questions, and ascertain a number of truths. We can follow out the inevitable consequences of the inexorable sternness of nature; we are able to discern how our acts, whether good or evil, are the beginnings from which a long train of efforts will arise; we can trace out the consequences of such acts in the hereditary transmission of qualities; and we can observe the modification of every organism by its environments. We cannot, however, tear aside the veil which hides from us the origin of life, and we cannot see its beginnings. We do know that there must have been a beginning, for the realm of nature has had its origin, "not in the utmost depths of a past eternity, but separated from the present time by a finite interval."[1] Thoughts such as these will show us what is ascertainable and what is beyond our possibilities of investigation. No matter how fascinating speculations may be upon the deep things hidden from our eyes, it is our first duty to study those within our ken.

It is a trite, but none the less true, saying, that it is not work but worry that kills. Hard work, in very truth, never kills, so long as it is carried out on sound foundations. And these foundations must be built upon the laws of nature.

Everything in nature is rhythmic; the rhythm is as exquisitely timed as a beautiful melody; the cadence of the melody is work and rest. The virgin tints of spring, with its budding promise, merge into the lush profusion of summer, pass into the harvest glories of autumn, and fade into the pallid death of winter. The rosy fingers of the dawn steal upon the eastern sky, and the morning breeze—the fabled breath of the sun's panting steeds—ushers in the coming day; the flying hours chase each other across the vault of heaven, till the evening star lights the silvery lanterns of the night. Man awaking with the morn rises from his couch with renewed energy, and labours till the evening, when sleep falls sweetly upon his wearied eyelids. Summer and winter, day and night, sleeping and waking, repeat the rhythmic strain. Nay, we may go further, for every throbbing pulse has its periods of action and repose, every breath we draw is instinct with the same sequence. If we are wise, we shall follow as closely as we can in the path thus clearly indicated, for

> "'Tis nature's voice, and nature we obey."[2]

There seems to be very considerable difficulty, in view of the enormous amount of knowledge you have to acquire, in arranging for the due alternation of work and rest. Let me say at once that it is far from my intention to impute blame to any one for the difficulties which we can see. The present system has gradually grown up during the last two centuries. At first there seems to have been only one session in the year—during the winter—and the students at that time, if they were so fortunate as to be country born and country bred, were able for nearly six months in every year to enjoy the beauties of nature. Happy youths! Judging of their labours by the records of the Royal Medical Society, as well as by direct or indirect references to their work in hospital reports and published papers, the long holiday of summer seems to have been the means of refreshing their energies, and they appear to have struggled strenuously with their tasks while at their studies.

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[1] Clerk Maxwell, "Address, Brit. Assoc., Liverpool," 1870.

[2] Homer, "Iliad," book II. (Pope's Translation).

This was not, however, the fate of all, for some students of medicine, we know, spent the summer in doing duty as unqualified assistants. It has to be remembered in this connection that in those days some form of the apprentice system was more or less in vogue on both sides of the Tweed. Even this alternation of attendance on lectures during winter and practical work during summer may, nevertheless, be regarded as restful, seeing that it furnished a change of occupation.

New subjects had one by one to be included within the medical curriculum, and to meet the increase in their number a summer session was added to that of the winter. Then, instead of beginning early in November, the winter session commenced earlier and earlier, so that, on at least one occasion, it began at the end of the first week of October. By and by it was discovered that four years were insufficient for the enormous amount of work which had to be got over, and about ten years ago it was decreed that, for the future, no one should be allowed to obtain a registrable qualification unless he had spent five years in medical studies. This is simple narrative, and it complains of no one, it censures no one; the course of events has been as inevitable as the footsteps of Fate in an old Greek tragedy. But the pity of it is, that with the addition of the fifth year to the curriculum, matters have not mended. Perhaps it would be too hard to say that the present state of affairs is worse than ever; it certainly is no better.

Now, last winter there was a Commission. These words make me almost imagine there is an echo to the effect: "'There was a ship,' quoth he."[1] You all know that there was such a Commission, and probably most of you know that those of us who were members of that Commission went through a considerable amount of arduous exertion. It is, however, not invidious to say that Mr. Hall, the secretary, spared neither time nor energy in its work. The labours of the Commission were necessarily limited to suggestions for a simple rearrangement of the subjects of the curriculum. We were urged on many sides to suggest certain radical alterations, but, knowing the limits of power possessed by the Senatus and by the Court, we forbore. To have made any other proposals would have been to stultify ourselves, since it appears beyond the limits of possibility to effect any greater changes, without invoking the authority of the Privy Council, or its Scottish Universities Committee. Recognising that the movements of their machinery are like those of the "mills of God," we should have been wasting our time and our paper if we had done more.

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[1] Coleridge, "The Rime of the Ancient Mariner."

A good many of the suggestions were warmly approved of by individual members of the Senatus Academicus and by almost the entire Extra-mural School, and it is a matter for congratulation that some of the proposals have been endorsed by the action of the University authorities. To condescend upon particulars, it is fortunate for the entire school that the Hospital hours, from eleven onwards, have been set free for Third Year men and their seniors.

It may savour at present of the Utopian to offer any further suggestions, but, having thought much upon the subject during the last few months, you will allow me to state some of the changes which would, in my opinion, conduce to the welfare of the entire medical school, certain of which will undoubtedly before long pass into the domain of realisation.

The first alteration is one of a somewhat radical character. Instead of the winter and summer session, which have for so long occupied the academic year, it would be infinitely better to have, as at Cambridge, three terms, beginning respectively in October, January, and May. My views on this subject are entirely in accord with those of Dr. Richard Berry, who lately produced a thoughtful article upon the subject,[1] and these views are shared by a very large proportion of those who have devoted any thought to the curriculum. If this improvement were carried out, it would render the rearrangement of the curriculum a simple matter, and although the suggested change has been called radical, there are not wanting indications, even on the part of the University authorities, of a need for some such arrangement. Certain courses of instruction even now begin in October and end at Christmas, while others begin in January and terminate in March. With three terms of ten weeks each, the various courses of instruction can be fitted in much more easily, and with a due sense of proportion. Botany and Zoology would, as at present, each have a three months course, to which practical classes would be added, and possibly Physics might be adequately treated, from the medical point of view, in a session of equal length. Chemistry would require two terms, and Practical Chemistry would require a third. Anatomy and Physiology in their systematised forms would certainly require six terms each, while Pathology would need at least three. In these three subjects adequate time would also be required for practical and technical instruction. With regard to

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[1] *Edin. Med. Journ.*, New Series, vol. x.

Materia Medica, a three months course of instruction in Pharmacy should be taken early in the curriculum, and at a later period a course of lectures on Pharmacology and Therapeutics should occupy two terms. This is known to have been the intention of Professor Fraser, but somehow, in the working of the Scottish Universities Commission, his wishes were not carried into effect. Medical Jurisprudence would receive a three months term, and Public Health a similar period. A much-needed improvement would be the separation of Midwifery and Gynæcology into two courses of three months each, which might be attended during two different summer terms. When we come to Medicine and Surgery, we find that the proposed system of three terms in the year would be most helpful. These two subjects should certainly have three terms each. In this way they could be adequately treated, and the apparent necessity for second courses would disappear. The clinical opportunities of the medical student would be considerably increased by a thorough arrangement of the systematic courses, and more time would be permitted for the study of Insanity, Ophthalmology, Otology, and Laryngology, Dermatology, the Diseases of Children, and any other special departments which are already, or may in the future, be recognised.

My views with regard to Examinations entirely accord with those of Dr. Berry. They ought to be held more frequently, and no candidate who has been rejected in any group should be allowed to proceed to the next course of instruction until he has passed. But there is one very important point as regards the final subjects which would be a great advance. Candidates should be examined at the end of the fourth year in the systematic aspects of Medicine, Surgery, and Midwifery, and the real Final Examination should be, as in the University of Dublin, upon clinical work in these subjects, along with the various special departments. In this way the fifth year would be an enormous boon to the future medical practitioner, as it would more thoroughly equip him for his life's work. To do this would be to carry out the spirit of the General Council, which allows the student to spend at least part of the final year in purely practical work.

In making these few remarks upon this branch of our subject, it is possible my views run counter to some of my colleagues, but it has been my endeavour to avoid any strictures that might give pain to any of them. We cannot all see eye to eye on such matters of detail, but we can recognise that each of us is solely actuated by an unselfish desire for the good of the whole school. It is probable that every one of us who is engaged in teaching is more or less tempted to lose a true sense of proportion, and to exaggerate the importance of his own subject. But the earnest aim of those who have deeply at heart the welfare of our Alma Mater is to yield in minor points of detail if we can secure the acceptance of weighty matters of principle.

You may think that my pleading has been for less work. Far from this, my sole wish is that you may be so favourably situated as to be able to turn out a greater amount, and a better quality of work, with the opportunity of taking better care of your health. More system in work; less waste of time: less sitting on benches; more hours in laboratory, ward, and dispensary: above all, more time for the open air. Such are the aims which have led me to make these remarks. And one of the greatest boons which could be obtained would be to have all lectures over in the forenoon, so that the afternoon would be free to a greater extent than at present. Celsus[1] tells us that it is the duty of every one to spend some part of every day in caring for health. How is that possible under present conditions?

Without due care for the health of the body, there cannot be sound health of the mind. This is a truism, no doubt, but it is a truism which the modern medical student seems to be expected to ignore. In respect of this matter, it is to be hoped that he will not follow the example of Allan Breck, who, you remember, had "a grand memory for forgetting."[2] No, let me ask you rather to bear in mind the words put in the mouth of an afflicted monarch by the greatest of English authors:[3]—

> "We are not ourselves
> When nature, being oppress'd, commands the mind
> To suffer with the body."

In one of Ruskin's later attempts to lead the people of this country to ponder over and care for the welfare of the people, he makes the remark:[4]—"In fact, it may be discovered that the true veins of wealth are purple—and not in Rock, but in Flesh—perhaps even that the final outcome and consummation of all wealth is in the producing as many as possible full-breathed, bright-eyed, and happy-hearted human creatures." It is primarily intended for the man engaged in manual labour; it is no less applicable to him who devotes his life to mental effort.

If we give due proportion of time to work, to exercise, and to rest, we shall all be able to make the most of our lives for others as well as ourselves, and we shall then be able more fully, and more fruitfully, to act up to the advice of one to whom this country owes more than tongue can tell:—

> "Go to your work and be strong, halting not in your ways,
> Baulking the end half-won for an instant dole of praise.
> Stand to your work and be wise—certain of sword and pen,
> Who are neither children nor Gods, but men in a world of men!"[5]

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[1] "De Medicina," liber i.

[2] Stevenson, "Kidnapped," chap. xviii.

[3] "King Lear," Act II. Scene iv.

[4] Ruskin, "Unto this Last," Essay ii.

[5] Kipling, "The Seven Seas," *A Song of the English.*

A PLEA FOR THE SYSTEMATIC TEACHING OF HEREDITY.

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In the whole range of science, in the whole range of human experience, there is no question of such importance as the question of heredity. This matter or that may especially interest this man or that, such as the advancement of tribal or national interests, the advancement of religious systems, or the choice of a particular means of livelihood. But the question of heredity has at all times interested all men. I suppose no sane man, savage or civilised, has ever reached years of discretion but has given some thought to it. Every religion, from Fetishism to Christianity, alludes to it. It has attracted constant interest among novelists, philosophers, and other dealers in fiction and fact. It is the principal theme of modern biological science. Less than half a century ago a great thinker dealt with it in a work which so shook the world of contemporary thought, which raised and triumphed over such an angry tempest of controversy, which so profoundly altered the outlook of civilised man on nature, that already men are saying that no man in any age did ever a work half so splendid or so pregnant with the springs of future knowledge, thought, and action.

Every theory of evolution is founded on, or at any rate implies, a particular doctrine of heredity. Darwin's theory of the origin of species may not specially concern medical men, but the doctrine of heredity implied by it does certainly concern them more closely than any other class of thinkers and workers. Heredity, the reproduction by offspring of parental characters, is after all a problem of physiology—by far its most important problem—and physiology is essentially a medical science. Never is a medical journal published, but, directly or indirectly, some question of heredity is raised in it. Never does a medical man pass a week but some question of heredity raises itself in his mind. His patients continually turn to him for light on it. His store of available data from which he may gather information is immense, and far exceeds in amplitude and exactness that possessed by botanists, zoologists, or the students of any other branch of biology. Man is the best known of living creatures, and no man has studied him with such minute and anxious care as medical men. They know him in mind and body; in health and in disease. They have crept over him with the dissecting knife and the microscope. None, then, should be so well qualified to speak with authority on questions of heredity, and therefore of evolution, as the medical man. More than any one's, it should be his duty to acquire a scientific knowledge of the problem. But, notoriously, the question has been neglected by him. The great controversy on evolution, which so occupied the minds of thinking men during the third quarter of the last century, found scarcely an echo in medical literature. The equally great controversy on heredity which has since divided the biological world, but which is now drawing to a close with the triumph of the younger party of disputants, has been as much ignored. Not one medical man has achieved distinction as a leader of thought through his knowledge of heredity. In not a single medical school is the subject systematically taught. In none is it a definite part of the medical curriculum. All medical men, it is true, have *opinions* on the subject. But these opinions are rarely founded on a scientific study of the abundant data within their grasp. As a rule, they are expressions of mere prejudices founded on popular superstition.

Several causes have contributed to this unfortunate result. Taken in the natural order, a study of heredity should precede a doctrine of evolution. Unhappily the reverse happened. Before heredity had been studied scientifically, and men's minds accustomed to the idea of racial change, Darwin propounded a far-reaching doctrine of evolution, which gave grievous offence to the orthodox of the time being. The dose was too big for the popular gullet, too strong for the popular taste. Men did not pause to consider that since the races of mankind had once a common origin, but are now widely divergent, and since every race is now specially adapted to its environment, therefore racial change (*i.e.* evolution) must have occurred to some extent at least. They condemned the whole doctrine; and evolution, with its allied science of heredity, fell into popular disrepute. Our profession, as a whole, shared in the prejudice, and joined with unction in the chorus of condemnation. Even had the teachers of medicine of that day been favourably inclined to the new doctrines, it would not have been diplomatic to add subjects so unpopular and controversial to the medical curriculum. Parents, who are not necessarily among the most enlightened of beings, have power of selecting the schools at which their sons should be educated. Another main cause of neglect was in the unlucky course pursued by the subsequent controversy. Heredity, like all sciences, should depend wholly on verifiable evidence. Many of the biological disputants in the controversy appear to have been intellectually incapable of dealing with evidence in any rational spirit. What should have been a science became a tumbling-ground for "whimsies." A problem intrinsically simple was so obscured by a monstrous outgrowth of so-called "working hypotheses," that it is no wonder that busy and practical-minded medical men generally turned from the subject with disgust. Nevertheless, out of the deluge of mystical speculations, in support of which biologists could produce no real evidence, at least one definite truth of high importance has emerged. That truth is well worthy the attention of medical men, and has, in fact, received a certain measure of attention. But if the discussions of biologists have in great part been rendered futile by a vain pursuit of irrational working hypotheses, the discussions of medical men have been rendered equally vain, mainly by the confusion which has arisen through a surprising misuse of well-established scientific terms.

The principal questions which men have asked of heredity have been two in number. They have asked *how* parents transmit their characters to offspring? and they have asked *what* characters parents transmit to offspring? The first question is of very ancient date. Probably men asked it as soon as they became human beings. But it is essentially metaphysical in nature. It is hardly a question for science. When we attempt to answer it, we quickly arrive at "ultimate facts," beyond which lie regions of the unknown, and perhaps the unknowable—regions, which in all ages have been the dumping-grounds of "working hypotheses" that one generation has proclaimed as light-giving, and the next as ridiculous. If to-day an ignorant person asks, "How are characters transmitted?" a learned man may reply, "By means of germ cells." But if the former then asks, "How do germ cells transmit characters?" the latter must at best declare his ignorance; at worst, he must take refuge in guesses. But of this more anon. Meanwhile, it is only necessary to add that, even were these metaphysical problems capable of solution, they would have little practical value, except in so far as they bore on the second question.

This second question is emphatically one for science. To solve it we need only patient observation and correct reasoning. The systematic study of it is of very recent date. It was only after the publication of Darwin's speculations that men clearly realised that the characters of living beings were separable into two great categories—the inborn and the acquired. Even then they did not understand the importance of the discovery. They assumed that all parental characters, acquired as well as inborn, tended equally to be transmitted to offspring. Even Darwin held this belief at first. But gradually a doubt crept in. First this man, and then that, timidly in the beginning but with ever-increasing boldness, expressed uncertainty, and then disbelief. Doubt and disbelief gathered head, and became conviction. At the present day, the great majority of those who have studied the question insist that acquired characters are not transmissible. If I now declare that this discovery—if it be a true discovery—is one of the most important achievements of science, I daresay I shall be thought guilty of extravagance. Nevertheless, the statement is true. Other great additions to our knowledge, such as those made by Copernicus and Newton, deal with vast masses and spaces; but, however splendid, they have not the practical importance this discovery has. It deals more immediately with life

—our life. It is part of the purpose of the present paper to demonstrate its importance.

The body of a multicellular plant or animal is compounded of the cell descendants of a unicellular organism, the fertilised ovum. Each cell of the body, though adherent to its neighbours, is, in a very real sense, a distinct and separate living entity—a unicellular organism. Blood cells, and wandering connective tissue cells, are free. Spermatozoa and ova are purely parasitic. Skin cells have been transplanted. Had we the requisite skill, it is probable that we could transplant every other kind of cell. The death of the whole organism (somatic death) is followed, only after a measureable interval, by the death of its component cells.

Watching the multiplication of an infusorian (*Stylonychia pustulata*), Maupas observed that, after two of these had conjugated, the resulting fertilised cell divided and redivided many times without conjugation again occurring; but that if, after a pretty certain definite number of cell divisions, conjugation did not again occur, the race ultimately died out. He found, moreover, that the descendants of a conjugated pair did not conjugate among themselves, but only with the descendants of another conjugated pair. All this is the rule among higher plants and animals. The ovum and the sperm are unicellular organisms. After conjugation, they divide and redivide many times without conjugation again occurring among the descendant cells. But these, like infusorians, if they do not conjugate, ultimately die out. Most of them (*i.e.* the somatic cells) are incapable of conjugation, while such of them as are capable of conjugation (*i.e.* the germ cells) conjugate only with cells from another body (*i.e.* cell family). There are, as is well known, exceptions to the above; unending reproduction may occur without conjugation, as among such plants as are propagated by slips or suckers, and self-fertilisation also occurs, but the general rule is as I have stated. *A multicellular plant or animal in the successive stages of its development is therefore the homologue, not of the remote ancestral unicellular organism, but of all those successive generations of unicellular organisms which intervene between one act of conjugation and the next.*

Unlike the cell descendants of a conjugated unicellular organism, the cell descendants of a conjugated germ differ from it, and from one another, in that they undergo differentiation along certain definite lines (into nerve, muscle, bone, etc.); the germ cells being so specialised that the cell communities which spring from them are very like the cell community of which they were cell members; for which reason a man, for instance, is like his parent. Moreover, the cell descendants of a conjugated germ differ from the cell descendants of a conjugated unicellular organism, in that they remain adherent, and in that, in different lines of descent, they multiply at different, though definite, rates.

Did the cell descendants of the germ all multiply at an equal rate, a solid spherical mass of cells would, of course, result; whereas, owing to differences in their rates of multiplication, the shapes of multicellular plants and animals are irregular (*i.e.* not spherical). But though these rates of multiplication in different lines of descent are pretty definite in every species of plant and animal, they differ widely in different species, whence arise differences in shape betwixt one species and another. An ox, for instance, differs in shape from a man, because in it the cells, in different lines of descent, do not multiply at the same rate as in man.

The cells of a multicellular organism are separable into two great classes—germ cells and somatic cells. The germ cells have the same relation to the other cells of the community as queen bees and drones bear to the rest of the swarm. For the purposes of heredity these other bees "do not count." They merely supply shelter and nutrition to their sexually perfect and entirely parasitic associates. In like manner all available evidence points to the conclusion that the somatic cells do not count for the purposes of heredity. Like worker bees, they merely supply shelter and nutrition to the purely parasitic germs.

Let us now try to define accurately the terms *inborn* and *acquired.* All conjugated germ cells tend, under fit conditions of shelter and nutrition, to proliferate into organisms (communities of adherent cells), very similar to the organisms whence they were derived. For this reason a man tends to have for offspring another man, a dog another dog. *Inborn characters are those which depend on the constitution of the germ cell.* Thus a man's head is an inborn character, because the germ whence he springs is so constituted that it tends, under fit conditions of shelter and nutrition, to proliferate into a being having a man's head.

Acquired characters are modifications of inborn characters caused by the play of forces on those characters after they have developed from the germ. Thus a man's hand is inborn; but if it be modified by use, disuse, disease, accident, or the play of other forces from the environment, the *modification* is an acquired character. It follows that a character is inborn or acquired, according to its place of *origin.* Inborn characters take origin in the germ; that is, they are blastogenic in origin. Acquired characters take origin in the cell descendants of the germ; that is, they are somatogenic in origin.

If once we grasp clearly the fact that the difference between the inborn and the acquired is one of origin, we shall avoid many of the somewhat grotesque errors which vitiate the writings of most medical authors who have dealt with this subject. In medical circles no discussion of it is possible without some one remarking, with an air of finality, "Acquired characters must be transmissible, for every character must have had a beginning, and therefore must have been acquired originally." This sentence is such a triumph of inaccurate statement and loose thought, and, within its brief limits, sets forth so neatly and compactly the principal source of the confusion prevalent in professional literature, that it is worth while to discuss it at length. It assumes that the difference between the inborn and the acquired is not one of *origin*, but of *age*, and that therefore all old characters are inborn, and all new characters are acquired. But speech and bipedal progression are very old characters. Yet they still remain acquirements, for every man still *learns* to speak and walk. Acquired immunity against this or that disease is another old character. It also remains an acquirement, for every man who acquires an immunity acquires it afresh. On the other hand, to term a new character an acquirement merely because it is new, is an absurdity, for more reasons than one. In the first place, the words "inborn" and "acquired" are old-established technical terms with very precise and definite meanings. Biologists have long used them to mark the distinction between blastogenic and somatogenic characters. An argument which is based on a misuse of words does not commend itself as a scientific proceeding. In the second place, the distinction between the new and the old is a valueless one. Every character is new to every individual that has it. Thus, to a man, his head is as new as a sixth digit, or any other deviation from the parental type. In the third place, the whole argument is beside the mark, for the fact that some new characters are transmissible has never been disputed. On the contrary, the fact that they are transmissible is the corner-stone of every theory of heredity. It is admitted on all hands that new blastogenic characters are transmissible—new characters, that is, which take origin in the germ cell. All that has ever been disputed is the allegation that somatic *alterations* (*i.e.* acquirements properly so called), whether new or old, are transmissible.

Offspring invariably differ somewhat from their parents. The differences may be blastogenic in origin, when they are technically termed *variations;* or they may be somatogenic in character, when they are technically termed *acquirements* or *modifications.*[1] *A variation, then, is a new inborn character.*[2] It is a new character, but it is not an acquirement. A modification is an acquirement, but it is not necessarily a new character; for, as we have just seen, many modifications have undoubtedly been acquired by every generation for thousands of generations. Moreover, while a variation always implies a difference from the parent, a modification may imply a likeness, since both the parent and the child may acquire the same modification. Modifications are alterations of inborn characters caused by the play of forces from the environment on the soma—on the mass of cells into which the fertilised ovum proliferates. The cause of variations is more obscure. Many theories to account for them have been formulated. Undoubtedly the union of germ cells from dissimilar individuals, the mother and father, is a cause of variations.[1] The play of forces—changes in nutrition, toxines in the blood, or what not—acting *directly* on the germ cells is a possible cause of variations among multicellular organisms.[2] It is, as we shall see, an indisputable cause of variations among unicellular organisms. However, it is unnecessary to discuss all the different theories. The main fact we have to note is that variations, however caused, do occur. Offspring do differ inherently from their parents. We need discuss one theory only—the theory that the modifications of the parent *so* affect his or her germ cells that the characters the parent *acquired* are reproduced as *inborn* characters by the child. This is of course the theory that acquired characters are transmissible.

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[1] "Acquired character," "acquirement," and "modification" are synonymous, or almost synonymous terms. If there be a distinction, it arises from the fact that there seems to be a tendency to limit the use of "modification" to *new* acquired characters.

[2] The term "variation" was formerly applied alike to acquired and new inborn characters. The writer gave it this wide signification in his work, "The Present Evolution of Man." More recently, in the interests of scientific precision, its use has very generally been limited to the latter. The importance of distinguishing clearly between variations and modifications lies in the fact that, whereas variations are admittedly transmissible, modifications are not.

It must be noted that a character acquired by the parent can never be inherited as an *acquirement* by the offspring. For were an acquirement transmitted, it would arise in the child in consequence of influences acting on the *germ*. The child would be born different from the parent was born.[3] It would make a different start in life. The modification of the parent would therefore reappear in the child as a new *inborn* character—a variation. Now, whether acquirements tend to be transmitted or not, one thing is certainly true—offspring often vary from their parents, are often born different from what their parents were born, even when no character has been transmitted. For example, the child of normal parents may have a sixth digit. But no one can *acquire* a sixth digit. It is inconceivable that such a complex structure can ever be superimposed on a normal hand by environmental influences acting on the hand *after* it has developed from the germ. To take an even more convincing instance: all the members of a litter of kittens or puppies invariably differ, not only from their parents, but from each other. It is impossible that the differences can be due to the transmission of parental acquirements, for in that case every kitten or puppy would inherit the same acquirements, and all would be alike. It is clear, then, that offspring frequently (I ought to say invariably) vary from their parents, quite irrespective of the transmission of any acquirements.

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[1] Offspring tend to reproduce the peculiarities of their parents; that is, germs tend to reproduce germs of like potentialities. The germ cells of dissimilar individuals therefore tend to be dissimilar. When they unite, experience proves that, as in the case of chemical compounds, the resultant is not necessarily an intermixture of qualities, but often something new and different.

[2] So far as the writer is aware, this has not certainly been proved in any instance.

[3] I use the word "born" to avoid circumlocution, just as the term inborn is similarly used. But of course birth does not divide the inborn from the acquired. The fœtus and the embryo may acquire characters (*e.g.* the effects of disease) just as well as the infant or the adult. The true distinction is between characters which take origin in the germ cell and those which take origin in its cell descendants —the soma.

The question we have to consider, then, is not whether *all* variations are due to the transmission of acquirements, but whether *any* variations are due to their transmission. The history of the question is instructive. The philosopher Lamarck assumed that *all* variations were due to the transmission of acquirements. His modern followers, a dwindling body, assume that *some* variations arise thus. Darwin started where the Neo-Lamarckians leave off. He assumed that, while many variations arise apart from the transmission of acquirements, some arise in consequence of their transmission. His modern followers, the Neo-Darwinians, who include the great majority of biologists, go a step further. They assume that *no* acquirements are transmissible, and therefore that none of the variations of the child are due to the inheritance of parental acquirements. They assume, in short, that variations arise "fortuitously."

The ground is now cleared. We have defined our terms, and need not founder in that quagmire of confusion in which a misuse of terms has involved our medical predecessors. We have seen that variations are admittedly transmissible to offspring, and therefore to remoter descendants; but that the transmissibility of modifications is denied, *i.e.*, it is denied that modifications of the parent are *transmuted* into variations in the offspring. We have seen, moreover, that the adherent mass of the cell descendants of the fertilised ovum which we call a multicellular organism, is, in the successive stages of its development, the homologue, not of the conjugated unicellular organism, but of successive generations of its cell descendants. The homologue of the conjugated unicellular organism is the fertilised ovum. The homologue of the non-conjugated unicellular organism is the non-conjugated sperm or ovum, or any one of the cells of the multicellular body.

The cell descendants of the fertilised germ differ from those of the conjugated unicellular organism in three important particulars—(1) They remain adherent; (2) they undergo differentiation in form and function; (3) they delegate the function of conjugating, and of continuing the race, to a particular set of cells, which are specialised for the purpose, the germ cells. All this is certainly true, and it requires no very great intellectual effort to imagine how the evolution of these peculiarities was gradually brought about through an enormously prolonged process of natural selection. Those germ cells were selected by nature to continue the race which produced organisms that varied favourably, *i.e.*, which had their cells adherent, differentiated, etc. But if the followers of Lamarck be right, if it be true that acquired characters are transmissible, then the cell descendants of the fertilised germ differ from those of the conjugated unicellular organism in yet another peculiarity—they possess mysterious and even magical powers.

According to the Lamarckian doctrine, changes in the cells of the soma are supposed to so affect the germ cells associated with them in the same body, that the million modifications of the soma are reproduced by the cell descendants of the germs (*i.e.* in offspring). A modification of a man's thumb (*e.g.* an effect of use) is supposed to affect his germ in such a particular manner that the modification is reproduced as an inborn trait by his offspring. A different modification of his thumb (*e.g.* an effect of injury) is supposed to affect the germ cell differently, but also in such a precise way that it likewise tends to be reproduced. A similar change (*e.g.* an effect of injury) in the great toe is supposed to affect the germ in a manner so profoundly different, that the peculiarity is reproduced, not in the thumb, but in the great toe of the offspring—and so on *ad infinitum*. One set of cells, the somatic cells, acquire modifications; the descendants of quite another set of cells, the germs, are supposed to reproduce them. It is as though the descendants of the queen bee were supposed to reproduce the modifications of the workers associated with her. It is as though the offspring of Brown were supposed to reproduce the acquired peculiarities of Jones and Robinson.

It requires a very great stretch of the imagination to conceive how these magical powers, if they exist, had origin. Obviously nothing of the kind can occur among unicellular organisms, the cell descendants of which separate, and therefore cannot influence each other. The powers arose, if they did arise, among multicellular organisms. But how? Biologists have not even considered the matter. Moreover, apart from this difficulty of understanding how the power of transmitting acquired characters arose in nature, Lamarckians have not even formulated a rational theory of the way in which the alleged transmission is supposed to be managed in the multicellular body. Some theories have been formulated, it is true, and we shall deal with them presently, but the answers they supply are distinctly not rational. Meanwhile, it must be remembered that it is not denied that changes in the soma *may, in some way*, affect the germs, and, through them, offspring, as for example by changing the nutrition of the germs.[1] Thus it is not denied that parental good health or disease *may* influence *in some way* offspring subsequently born. It is only denied that the different modifications of the soma can and do influence the germs in such *special* ways that offspring tend to reproduce those *particular* parental modifications.

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[1] *Vide ante*, p. 412, footnote No. 1.

It is true that at first sight it appears only reasonable to suppose that the son must reflect the parental changes, the perhaps profound parental modifications. But this opinion is really founded on the popular and ancient, but very superficial and erroneous, idea that the son is descended from the *whole* of his parent; the actual truth being that the son descends only from a minute speck of his parent, the germ cell. The question whether the fowl produces the egg, or the egg the fowl, is an old enigma; but modern biology places us in a position to answer it. The fowl, as a whole, does not produce the egg; that is, all parts of the fowl are not concerned in reproduction. Only a minute speck of the fowl produces the egg. So far as we know, the other parts of the fowl merely supply the speck with shelter and nutrition. On the other hand, the minute speck (the egg, the germ) does certainly produce the whole fowl.

A priori, then, the doctrine which affirms the transmission of acquired characters appears wildly improbable—so very improbable that only the clearest and most massive proof should satisfy us. It is not rendered in the least more probable if we ignore the cell theory, and insist on regarding the multicellular organism not as a community of adherent cells, but as a single entity, as a sort of huge single cell. Even in that case the offspring does not descend from the whole mass, but only from a minute fraction of it. We are still faced with the difficulty of understanding how changes in the other portions of the mass influence the fraction in millions of precise directions. The difficulty becomes neither more nor less. It remains the same.

Has evidence been furnished proving the transmission of acquired traits? The simple fact is that, though for twenty years biologists have ransacked the plant and animal kingdoms, no single indubitable instance of the transmission of an acquirement has yet been proved. Hundreds, nay thousands, of instances of transmission have been alleged, but the evidence has invariably broken down on investigation. Mutilations are still cited by medical men, but the belief in their transmission has been abandoned by all or nearly all biologists. Mutilations are so very many, and the instances of their apparent transmission so few, that all such instances may be disposed of as mere coincidences, as confusions of *post* with *propter hoc.* Women still retain their hymens, Jews their prepuces, terriers their tails, after centuries of mutilation. How often do medical men see the mutilations caused by disease or the surgeon's knife reproduced? The parent acquires a mutilation, and the child in very rare cases *happens* to vary from the parent in such a way that the acquirement is apparently reproduced—but only *apparently.* One swallow does not make a summer. Were mutilations transmissible, then, not in one apparent instance out of a million, but in all or most instances, would the acquired peculiarity be reproduced by the child. There is one test, and one only, by which the tranmissibility of a mutilation can be tested—its constant reproduction by offspring. Under that test the theory that mutilations are transmissible is easily proved to be without foundation.

Maternal impressions are supposed to supply evidence. The arguments founded on them supply evidence of remarkable confusion of thought only. The mother acquires one thing, a mental impression. The child is supposed to inherit quite another thing, a physical malformation. Nothing the mother *acquires* is transmitted. Moreover, the apparent "transmission" of maternal impressions is so rare that instances of it also may be attributed to coincidence. A million women may each receive a thousand impressions, yet no instance of "transmission" may be observable in the offspring of any of them. I am not aware that lady doctors and nurses are peculiarly liable to bear malformed children. The test of constant reproduction is as applicable in this instance as in the case of mutilations.

Telegony—the transmission of the influence of a previous sire—has been supposed to supply evidence. Here, again, there is a confusion of thought. Supposing it were true, which it is not, that a black woman, after bearing a child to a white man, tended to bear fair children to black men,—even in that case there would be no transmission of an acquirement. The mother is not supposed to become fair. Moreover, Professor Cossar Ewart's classic Penicuik experiments conclusively prove that the belief in telegony is a mere superstition.

The effects of various diseases are supposed to supply evidence. In a recent article[1] I examined the evidence somewhat at length. It is so important, however, to have clear ideas on this great subject, that I venture to repeat some of it. Gout is constantly mentioned in medical works as affording evidence of transmission. The sins of the father are supposed to be visited on the heads of the children. Here *diathesis*, an inborn trait, is confused with *disease*, an acquirement. Some men are so constituted, that, under fit conditions, they tend to develop gout; the children inherit the inborn trait, the diathesis, and, under like conditions, tend in turn to develop the same disease. But there is no evidence that parental high living influences, in the slightest degree, the liability of the child to gout, nor even that generations of high living tend to evolve the gouty diathesis in a self-indulgent race. The children of poor Irish peasants, when removed from their normally miserable surroundings into a more comfortable environment, are as liable to gout as the scions of the British aristocracy. In fact, judging by the analogy of other diseases, it is probable that were gout very prevalent, and a considerable cause of death or serious disablement, the race that was most afflicted by it would, by the weeding out of the unfit, become in time the most resistant to it, *i.e.* the least liable, under given conditions, to contract it.

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[1] *The Scottish Medical and Surgical Journal*, June 1900.

Syphilis has been instanced. But syphilis is never inborn. Presumably it depends on the presence of a particular species of pathogenic microbe. The child acquires the disease as much as the parent, and therefore no acquirement is transmuted into a variation. It would be as reasonable to speak of a bullet, which had passed through a mother and lodged in her fœtus, as an instance of the transmission of an acquirement.

Hæmophilia has been instanced. But hæmophilia is never acquired. It appears in the first instance as a variation, and for that reason is transmissible.

Practically speaking, the biographical upholders of the Lamarckian doctrine now limit themselves to the contention that the effects of use and disuse are transmissible. It was the great thesis of Lamarck himself. The blacksmith's children are supposed to be exceptionally strong, because his labours endow him with exceptional strength. Sedentary and intellectual occupations are supposed to benefit offspring intellectually, though at the expense of their physical powers. Hares are supposed to be swift, because their ancestors practised swift running. The giraffe is supposed to have a long neck, because its ancestors stretched upwards for food. The elephant is supposed to have a short neck and a long proboscis, because its ancestors stretched their noses rather than their necks. And so forth, and so forth. Acquired immunity against this or that disease comes under the head of use-inheritance. A man is supposed to get "used" to the disease and to transmit his acquirement to his offspring—hence the alleged reason that races which have longest suffered from any disease are the most resistant to it.

But blacksmiths' children develop the parental strength only after undergoing similar labours, *i.e.* they acquire the parental acquirement afresh. There is no evidence that they acquire it more easily than the children of other people. Nor is there any evidence that the children of clerks are stronger mentally, and weaker physically, than the children of blacksmiths, when placed under the same conditions. All animals strive to run swiftly like the hare. All animals stretch both their necks and their noses for food. Yet they do not all become swift of foot or long of neck or nose. Acquired immunity against disease is never transmitted. In each instance offspring acquire it anew. If ever the offspring of a person who has acquired immunity exhibits an inborn immunity, the instance is so rare as again to justify us in appealing to coincidence. The child *happens* to vary in the direction of the parental acquirement.

It is, however, by appealing to the known facts of evolution that we gather most decisive evidence against the Lamarckian doctrine of use inheritance. All theories of heredity are, in effect, theories of evolution; at least, every theory of evolution is founded on a theory of heredity; and every theory of heredity has, for its logical outcome, a theory of evolution. Thus, were acquirements transmissible, it is evident that the successive individuals of a line of blacksmiths would grow successively stronger and stronger. All beneficial agencies, in fact—exercise, fresh air, good food, etc.—would be causes of evolution. All injurious agencies—such as many diseases, cold, hunger, and hardship of all kinds—would be causes of degeneration. On the other hand, if acquirements be *not* transmissible, beneficial agencies obviously cannot be causes of evolution. The rôle is then played by injurious agencies, which, by eliminating the inferior individuals of a race, gradually raise the racial mean, and so cause evolution. It follows, therefore, that the two opposite theories of heredity, the Lamarckian and the Neo-Darwinian, lead inevitably to two opposite, violently opposed, and utterly incompatible theories of evolution. Let us then see which theory of evolution is confirmed by the facts of nature.

Obviously use-inheritance can have played no part in the evolution of the vegetable world. Plants do not *use* their parts,[1] and therefore cannot have been evolved through the transmitted effects of uses. But every plant varies from every other plant, and the struggle for existence is keen amongst them. Their evolution must be attributed, therefore, not to the transmission and accentuation of modifications, but wholly to the accentuation of variations, *i.e.* to the action of natural selection.

The lowest multicellular animals are vegetative in type, and can scarcely be said to "use" their parts any more than plants. Higher in the scale, they use their parts actively, and therefore on that account there is a possibility of use-inheritance. But there is no evidence that an insect or a fish, for instance, grows in response to the stimulation of use.[2] Apparently both fish and insect are capable of reaching full development in the complete absence of such stimulation. Thus a perfect butterfly develops from a quiescent chrysalis. Even higher in the scale, if a tadpole finds its way through a crevice into a small cavity, it will, if food be obtainable, develop into a perfect frog, though practically debarred from all exercise. Higher yet, among the lower birds and mammals (*e.g.* fowl, sheep), development, as a result of use, becomes clearly apparent. The young come into the world, able to use their limbs and perform many other elaborate actions. But they develop greatly afterwards, in response to exercise. Yet higher, the animal (*e.g.* parrot, dog) comes into the world more helpless than the chick or lamb, and makes larger use-acquirements. Man, the highest of all animals, is quite helpless at birth. No animal makes such enormous acquirements subsequently. His limbs grow solely in response to use and exercise. Thus the paralysed limb of a baby does not develop. His heart, lungs, kidneys, brain, etc., grow in consequence of the strain placed upon them. With the exception of his eyes, ears, teeth, hair, and genital organs, scarcely a part of him reaches full development except through the strain of use. Adult man consists, therefore, of a huge superstructure of use-acquirements, built on a comparatively slender foundation of inborn traits. In the case of the highest animals, then, especially in the case of man, not only do animals use their parts actively, but their parts plainly develop in response to use. Here, then, if anywhere, we should have examples of use-inheritance.

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[1] The statement that plants do not use their parts is true in a general sense. There are, however, some slight exceptions, which, however, do not affect the argument. For example, Kauri pines, growing in exposed situations, have tougher and harder wood than trees growing in sheltered valleys; climbing plants support themselves by various contrivances.

[2] It may be replied that there is no evidence that it does not, and the presumption is that, like higher animals, it does. But it will be seen presently that there is strong reason for believing that the power of making use-acquirements is quite a late product of evolution. It is possible or probable that it has its beginnings even so low as among reptiles and insects, but in that case it is certain that it does not develop in them to more than an infinitesimal degree as compared to higher animals.

But much of the above is disputable. In the absence of experimental evidence, it is not possible to prove absolutely that the body of the frog does not develop equally with the body of the man, in response to use. Let us then turn from body to mind. It supplies evidence which is much more certain, and an analogy which is in all probability true. The lowest animals have almost certainly no minds. At any rate, there is no evidence that the vegetative sponge is a more conscious agent than a geranium. Higher in the scale, where more active and complex movements necessitate a controlling agency, mind apparently dawns. Instinct gradually plays a greater and a greater part. Take, for instance, the case of the beetle *Sitaris.* It lays its eggs at the entrance of galleries excavated by a species of bee. The young larva, after emerging from the egg, lies torpid during the winter. In spring, when the drones emerge from the galleries, it fastens on one of these and remains with it till the nuptial flight, when it transfers itself to the female bee. The latter excavates a cell, fills it with honey, and lays an egg in it. *Sitaris* thereupon springs upon the egg, which supplies it with its first meal. Subsequently it devours the honey.

Many analogous cases of the astonishing development of instinct may be given. But, however surprising and elaborate these instances of instinct may be, there is no evidence that the animal possessing them makes any mental acquirements. Most of its actions are performed only once, but, even when they are done more often, practice does not improve the performance. It is perfect from the beginning. There is no evidence, in fact, that instinct is sharpened by use. The animal is born with a certain mental equipment, to which apparently it adds nothing. It does not profit by experience; it cannot *learn;* it has no *memory.* We cannot suppose that the sphex, for instance, which stings a spider accurately in its nerve ganglion, can learn anything from the operation. It has and can acquire no knowledge of the anatomy of the spider. If we suppose that it profits by experience, we must imagine it gifted with acumen and powers of observation wonderfully beyond human powers.

Higher in the scale we find a gradual evolution of the power of making mental acquirement, and concurrently with it a gradual disappearance of instinct. The young puppy, for instance, is very helpless and ignorant at birth, but subsequently learns a great deal. The human infant is even more helpless, but his subsequent mental acquirements are enormous. In fact, it is this pre-eminent capacity to profit mentally by experience, to learn, that constitutes man's special distinction from the brutes. Instinct, no matter how highly developed, can adapt to a very narrow niche in nature only. But man, owing to his mental receptivity, can adapt himself to a thousand different modes of life—tinker, tailor, soldier, sailor, journeyman, ploughboy, thief, etc. etc. His power of making mental acquirements is therefore a vastly superior substitute for any number of instincts.

One thing is now plain. The power of profiting mentally by experience, of acquiring mental traits, of developing mentally in response to use, of being "intelligent," is an enormously important faculty which is discernible only in the higher animals. It is, therefore, speaking comparatively, quite a recent product of evolution.[1] So much is certain. Moreover, all the evidence points to the conclusion that the power of developing physically, in response to use, rests on the same basis. Now, let us summarise our facts, and see how they bear on the problem of use-inheritance. Plants and the lowest animals do not "use" their parts; therefore amongst them there can be no use-inheritance. Higher in the scale animals use their parts, but make no use-acquirements; therefore no use-acquirements can be transmitted. Yet higher in the scale, animals use their parts and make use-acquirements, but none of these are transmitted. Every animal has to make its use-acquirements afresh. Plainly, then, the doctrine of use-inheritance has no foundation. Were it true, mental acquirements would crystallise into inborn traits (*i.e.* instincts) in subsequent generations. But, obviously, instincts have not this origin, since the animals in which instinct is most developed do not profit by experience, do not make use-acquirements. Had instincts this origin they should be non-existent among the lower animals, and reach their highest development in the highest animals. The direct contrary is the fact.

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[1] It is evidently correlated to the evolution of the brain, the cerebrum being the organ for making mental acquirements, *i.e.* the organ of memory and all that flows from memory.

It may be argued that, among the higher animals, use increases not only the number of acquirements, but *the power of making them* as well, and it is the latter that is transmitted. But this view is likewise plainly erroneous. In the human being, for instance, the power of making acquirements, mental and physical, is greatest in infancy, and it is mainly by virtue of it that the infant develops into adult man. But the power constantly declines during the passage from infancy to old age, till it almost disappears in the old man, who can grow neither mentally nor physically. Here, again, since nothing is acquired, nothing can be transmitted.

As already indicated, acquired immunity against zymotic disease is an example of the effects of use. The man who acquires immunity gets "used" to the disease. Experience of it develops his powers of making resistance. Medical men very generally believe that the superior powers of resisting this disease or that, which various races exhibit, are due to the transmission of acquired immunity. The doctrine of the transmission of acquired powers of resisting disease has been discussed at length elsewhere. At present it is only necessary to say that, so far from proving the transmission of acquirements, a study of zymotic disease furnishes evidence against the Lamarckian doctrine more massive and convincing than any other.[1]

Bacteriologists have been able to attenuate or intensify, more or less permanently, the virulence of various species of pathogenic micro-organisms by their surroundings. Thus, they have attenuated the micro-organisms of smallpox by cultivating it in the calf, and that of anthrax by submitting it to a high degree of heat. It has been claimed that they have thus proved the transmission of acquirements. But every microbe is a *unicellular* organism, and every unicellular organism is a germ cell. If a unicellular organism (or a germ cell) is modified, it transmits its modification to its *own* descendants. But when a multicellular organism is modified, one set of cells, the somatic cells, are supposed to be altered, and quite another set of cells, the germ cells, are supposed to transmit the alteration. Evidently the cases are not similar. In the unicellular organism a modification, from the nature of the case, is a variation, since it affects the germ cell; and as such it is transmissible.

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[1] *Vide* "The Present Evolution of Man," London.

(*To be continued.*)

THE TREATMENT OF SEVERE DIPHTHERIA.

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A DETAILED description of grave diphtheria is beyond the scope of this paper. An outline, however, giving prominence to points which bear on treatment, is perhaps made necessary by the fact that the view advanced as to the nature of diphtherial toxæmia and its consequences is partly based on unconfirmed sphygmometric observations.

The observations, it is fair to explain, have been made with the pocket—not the aneroid—form of the Hill-Barnard sphygmometer. There was a practical reason for selecting the pocket form, although the margin of possible error, owing to the personal equation, is greater and may be considerable even when due care is exercised, and the results are checked by a second observer. It is also a question, to my mind, whether the instrument gives a high enough register of mean pressure when used in the case of children, and more particularly when applied to the radial, as against the femoral, artery.

These reservations are necessary, because I regard the blood pressure curves as absolutely too low, and only approximately accurate as regards relative variations.

THE ESSENTIAL FEATURES OF GRAVE DIPHTHERIA.—These may be conveniently divided under four heads, although the successive stages overlap more or less, and, in so far as they do so, are concurrent.

1. The primary feature is a well-marked local lesion, most often affecting the tonsils and adjacent parts.

2. After a time the toxine is in the organism in sufficient quantity to produce its physiological effects. The most obvious of these effects is a relaxation of the blood vessels which causes a fall in blood pressure.

3. Later, the specific poison induces an earlier form of degeneration affecting certain organs, more particularly the heart. The wall of the left ventricle is specially weakened by the fatty change. More or less dilatation ensues, and, as a result of heart failure, there is an additional fall in blood pressure. As this fall increases, the blood accumulates in the splanchnic area, leaving a deficient supply for the superficial parts. Hence, the skin is pale, and the surface of the body cold. There is also a drop in temperature, which, as a rule, eventually becomes markedly subnormal. Another result is a diminution of the urine. It becomes scanty, if not suppressed. Extreme restlessness is usual, and the mind remains clear until death. To these symptoms—in part, at least, the physiological outcome of an extreme fall in blood pressure—must be added a group more immediately referable to the cardiac dila-

tation. Thus, there is practically always persistent sickness; the pulse, in the first stage, small and compressible, becomes irregular and tends to disappear; and, in some cases, there is anginal pain.

The degenerative change in the kidney is excluded from the above description as being of secondary importance. There is good reason to believe that the degeneration is caused by the toxine. One of the facts favouring this view is that the renal excretion of the toxine has been experimentally proved in animals. The albuminuria which results may, indeed, be taken as a rough measure of the degree of toxæmia, and is of some prognostic value. The graver significance of extreme oliguria and suppression may possibly be explained by the fact that the toxine, instead of being excreted, accumulates in the organism. It appears likely that the reduction of the urine is, as stated above, the result of lowered blood pressure; the degenerative change in the kidney having little or no effect in this regard. In making this statement, the more direct dependence of renal excretion on local blood pressure is not overlooked. In cases of prolonged suppression, it must be admitted that a uræmic element enters into the morbid condition, but the only manifestation attributable to this is contraction of the pupil—unless the persistent vomiting, constantly present, is in part originated by it.

4. A later degenerative change, usually following a remission or period of semi-convalescence, affects the peripheral nerves.

MODES OF DEATH FROM SEVERE DIPHTHERIA.—Omitting cases in which a fatal issue is due to complications, such as pneumonia, or is accidental, as when the larynx is occluded by membrane, certain modes of death are attributable, directly or indirectly, to the toxine.

1. Although it cannot be stated with certainty, death may possibly occur from a severe primary fall in blood pressure, combined with other unknown effects. It is also suggested that sudden movement, even in this stage, with a considerable fall in pressure, may induce fatal syncope, owing to vasomotor compensation being prejudiced. Early death is now very rare, especially owing to the introduction of antitoxine.

2. Before there is any appreciable recovery of the vessels from the primary relaxation, the degenerated heart may fail, although it is working under the favourable condition of a lowered blood pressure. Early failure is almost invariably gradual, no doubt because of the condition just mentioned, and the fact that the danger of exertion or even undue movement at this time is generally recognised.

3. The degenerated ventricle may work satisfactorily while the toxic fall in pressure remains very low, but fail when a rise towards the normal point increases the tension in the aorta. This is the probable explanation of belated heart failure occurring under rest conditions.

4. The ventricle may hold its own against the rising blood pressure, but fail when the convalescent patient, believed to be past all danger, is allowed to undergo exertion—often trivial. These are, occasionally, cases which have not been examined for cardiac dilatation before being allowed out of bed.

5. It is very doubtful if death ever results as a phase of diphtherial paralysis from interference with the nervous mechanism of the heart.

6. A not uncommon cause of death is paralysis of the respiratory muscles. When the diaphragm is involved, the lower part of the chest is broadened, and the abdominal movement is absent or reversed. There is cyanosis, inefficient movement of the chest, a frequent husky cough, and mental distress.

PRINCIPLES OF TREATMENT.—The main principles of treatment are:—(1) To keep the local lesion clean, and, so far as may be, free from secondary micro-organisms; (2) to neutralise the toxine; (3) to counteract the toxic relaxation of the vessels, with the primary fall in blood pressure; (4) to avoid heart failure; (5) to maintain the temperature; (6) to encourage renal excretion; (7) to prevent or allay vomiting; (8) to hinder, if possible, the development of grave paralysis.

The treatment of the local lesion.—Generally speaking, the degree of toxæmia is proportionate to the extent and thickness of the membranous exudation. Unfortunately, when once established, no local application has any obvious deterrent effect on its development. It can, of course, be removed, but increased knowledge of the pathogeny of the disease has thrown discredit on this procedure. In cases of pharyngeal and nasal diphtheria, the best local treatment is to wash out the affected cavities periodically. In hospital, this is commonly done with boracic lotion, a glass syringe being used. For children who struggle, a four ounce ball syringe is preferable, as the hand, when holding it, more easily follows any movement of the head. The beneficial results of this treatment are, that the cavity is kept clean, and septic organisms are washed away from about the lesion. It is also a great practical gain that the period of infectivity is distinctly shortened. I may mention, as a minor practical point, that boracic lotion very occasionally has an irritating effect on the mucous membrane of the pharynx, which remains sore, raw, and bleeding, until the treatment is stopped. In these cases, salt solution may be substituted. It has been alleged that syringing increases the chance of otitis. Comparative observations made in my wards do not confirm this. The spray, as a substitute for the syringe, is, in my opinion, ineffective.

The treatment of secondary streptococcal infection.— Strictly speaking, the consideration of mixed cases of infection is foreign to the subject of this paper. Such cases, however, are too common to be entirely ignored. I have used a combination of antidiphtherial and antistreptococcal serum in a few cases with no obvious advantage. While the weight of clinical evidence is in favour of the view that unmixed cases are the graver, the additional infection has, of course, its danger. This is shown by an instance which I venture to record because of the unique fact that it was possible—as well as a vital necessity—to remove the source of secondary toxic disturbance.

CASE 1.—The patient, A. P., æt. 1, was in the habit of sucking his thumb, at the base of which, while he was developing typical pharyngeal diphtheria, there existed a small wound. The specific bacillus was found in the wound almost at the outset, but by the time the pharyngeal membrane was beginning to be diffluent, pyogenic bacteria had displaced it. An incision was made in the back of the hand and a quantity of pus liberated. Subsequently the patient was admitted to hospital, the whole hand being hopelessly involved. The pharyngeal diphtheria was not of the severe type, and yet the patient was rapidly losing ground. Death was only a matter of time, when Mr. R. H. Allen, after a consultation, amputated above the wrist. The patient suffered from severe shock—that condition being almost identical with, and therefore an aggravation of, the diphtherial toxic state—but rallied, and ultimately recovered. The amputation wound, as was to be expected, healed slowly, but an excellent stump resulted.

The neutralisation of the toxine.—Antitoxine probably produces its effect by combining with the toxine to form a neutral substance. Consequently the blood pressure rises. Under specially favourable conditions the extent and rapidity of the rise is remarkable.

CASE 2.—The patient, æt. 9, was in the second day of the disease, with, already, fairly thick membrane covering both tonsils, and the fringe of the soft palate on one side. The fall of blood pressure was severe, and, in light of its short duration, could with certainty be ascribed to the primary toxic relaxation of the vessels. Twenty-five thousand units of antitoxine were injected, and *within an hour* the pressure had risen 20 mm. A similar dose was administered on the following day. Such rapid improvement, however, is rare, as patients are seldom seen until the disease has endured for some days, and, in the few early cases, the toxic condition is generally much less marked.

If antitoxine could always be given in an adequate dose before the specific poison had initiated cardiac degeneration, there is weighty reason for believing that further treatment would be of very minor importance. Statistics, as shown by the vaccination controversy, will not convince the prejudiced; but the figures published from time to time, of the results obtained with diphtherial antitoxine, are sufficiently significant to convince those who keep an open mind. I may here mention a fact which has brought home to me the efficacy of the treatment in a more concrete way. Practically every nurse in the diphtheria wards of the Plaistow Hospital contracts the disease. Before antitoxine was given, one probationer died, and it was a common thing for a member of the staff to be in danger. For some years, however, the strict enforcement of a rule as to the reporting of sore throat, in order to insure early diagnosis and treatment at the outset by antitoxine, has had the striking effect of excluding diphtheria from the diseases which have placed members of the nursing staff in danger. I believe there are signs of a coming reaction against the use of antitoxine. If so, it is no doubt the fruit of a too great reliance on a method which has several serious limitations. Under such exceptionally favourable conditions as those just mentioned, it will maintain its present reputation, based, as it mainly is, on hospital experience; but, in practice generally, cases must constantly occur in which doubt as to its efficacy appears reasonable. Only by clearly recognising the special conditions in each case can a fair estimate of its efficacy be made. The necessity for early administration is of course the gravest limitation. Not only do a proportion of cases come under notice when the beneficial effect is diminished, or no longer evidenced, but it happens at times that diagnosis is suspended until toxic symptoms are typically manifested. Again, statements made by ignorant friends of patients as to the duration of illness is often misleading. In this connection, it is to be remembered that the most dangerous phase of diphtheria, when antitoxine is useless, if not harmful in large doses, does not generally supervene until the membrane is disappearing. It follows from this that the amount of exudation is only an index of severity in the early stage. The point may seem very obvious; but I have known more than one instance in which the patient has been seen for the first time when little membrane remained, with the consequence that, depending on the efficacy of antitoxine, an unwarranted favourable prognosis has been given. The result in such cases cannot improve the reputation of the treatment. There are differences in the appearance of the local lesion when the membrane is developing and disappearing, which, with other considerations, should make such a mistake impossible. Another limitation is the uncertainty as to what is an adequate dose for a given case. It often happens that an insufficient dose is given, and has to be repeated—it may be, several times—while the patient drifts towards the stage when even heroic doses are without effect. Moreover, with poor patients, treated at home, the price of serum is a practical difficulty in the way of liberal dosage. The moral of the following case, relative to these limitations, is apparent:—

Case 3.—The patient, E. V. B., æt. 13, was stated to be in the second day of the disease, but more probably the case was of four or five days' duration. Thick membrane occupied both tonsils and the greater part of the soft palate, and there was a profuse discharge from the nose. The blood pressure on admission was very low—on discharge about normal. In all, the patient received 76,000 units. Possibly 40,000 units given at the time of first administration would have produced an equally beneficial effect.

This case illustrates another possible limit to the antitoxic method, namely, the harmful action of the serum in which the antitoxine is contained. I do not refer to the rash, joint pains, and fever, which are often manifested after a latent period, but to less obvious and immediate physiological disturbance. Luckily, horse's serum has a comparatively low degree of toxicity; but I have little doubt that the quantity sometimes necessary has a prejudicial effect. I have occasionally noted a distinct fall in blood pressure follow a large dose of serum given very late, while, more rarely, a period of semi-somnolence has resulted.

Enough has been said to indicate the view that, in spite of the efficacy of the antitoxic treatment, under suitable conditions, there is room for supplementary methods. Indeed, the necessity for them remains as great as ever, because inadequate and late doses of antitoxine enable many cases to survive until the third and fourth stages, without protecting them from the dangers involved. This is the probable explanation of the recent greater frequency of death from gradual heart failure, and the increased incidence of paralysis among cases treated by antitoxine.

Treatment other than antitoxic, directed against the primary fall in pressure.—The object is to prevent physiological disturbance resulting from the fall in pressure, and especially to maintain the free excretion of urine. Strychnine must be placed first among the remedies in this stage. It should be given from the very outset. The power of preventing cardiac degeneration in febrile diseases has been attributed to it. In diphtheria it may indirectly have this effect if it improves the tone of the arteries, and by raising the blood pressure, aids the excretion of the toxine. Using hypodermic tabloids which contain $\frac{1}{150}$ of a grain, I prescribe a quarter four-hourly for a young child. Next in merit comes caffeine, which has been stated to cause an increased flow of urine as a special local effect. Digitalis is dangerous. Its cumulative effect is felt in the following stage when an increase in peripheral resistance may be a factor in the failure of the ventricle. It is a point in treatment that sudden movement or exertion is inadvisable even in this stage if the type of the disease is severe.

The treatment of heart failure, with the secondary fall in pressure.—The secondary severe fall in blood pressure, from failure of the ventricle, is of course dangerous, and treatment calculated to increase it cannot be adopted with impunity even when the object is to relieve the strain on the ventricle. Some years ago I prescribed nitroglycerin to relieve exceptionally early and severe anginal oppression, and the alarming effect was one of the considerations which drew my attention to the important part played by a fall in blood pressure in the diphtherial morbid condition. On the other hand, the blood pressure cannot be safely raised, because the dilated ventricle is already working with difficulty against the low tension in the aorta. From this, it follows as an important practical point that methods which raise the blood pressure by constricting the vessels, although they may be beneficial in the second stage, may cause death in the third. Digitalis has been mentioned in this connection. Although its action is stated to be partly cardiac, it only produces a slightly increased tonicity of the pulse, followed by accelerated failure of the ventricle. Saline infusions are, I believe, also dangerous at this time, because they cause not only a distinct but a quick rise in pressure, during which the ventricle may fail. I have knowledge of two cases in which sudden fatal syncope occurred towards the end of an infusion. The patients, it is true, were beyond the reach of other treatment, but death was very unlikely for at least some hours. All the circumstances tell against a theory of coincidence. What, then, can be done for the patient? Alcohol is here the chief agent, and should not be given earlier. I generally prescribe 1½ oz. as a minimum quantity for a small child. This is given in two-hourly doses with the feeds. If there are successive critical attacks of syncope, ether and a hypodermic syringe are kept by the bedside. When the failure of circulation is marked, the lower end of the bed is raised about a foot by means of wood blocks. In those cases where gradual recovery occurs, and the heart is once more working satisfactorily, it must not be taken that the ventricle is in its normal condition—the patient is at rest and there may also be the favouring condition of a blood pressure still somewhat below normal. Before allowing the patient to sit up, the heart should be carefully examined for dilatation, and even when none is found ordinary methods of life ought only to be resumed gradually and with caution in regard to sudden movement and exertion.

The treatment of apyrexia.—It is probable that the drop in temperature is in part the physiological consequence of the fall in blood pressure, although there are some considerations not in conformity with this view. Practically, in any case, it is a matter of great moment to maintain the temperature, because the heart fails more rapidly if it falls below the normal point. This is shown by the marked improvement in the action of the heart, which results from the vigorous application of heat, when a thoroughly chilled patient with a low internal temperature is admitted to hospital. Wrapping the patient in blankets and the like is useless. There must be an actual application of heat to the surface of the body, as by a number of hot bottles. In a critical emergency the best result is obtained by holding blankets close to a fire and using them, as hot as possible, in frequent relays. Owing to the low vitality of the cutaneous tissue when the fall in blood pressure is severe, great care must be exercised in employing even moderate heat, or an injury in every way comparable with a burn may be caused.

The treatment of oliguria and anuria.—Some of the measures mentioned under other heads are indirectly relevant in this regard. In all severe cases the quantity of urine passed daily should be charted. An almost certain but restricted prognosis can be based on the record, for so long as the urine is not running down in quantity very markedly the patient is safe. Exceptions are very rare. When only a few ounces are passed in the twenty-four hours, I order a very large poultice to be applied to the loins night and morning. This generally, for a time at least, increases the flow of urine—one of the few points difficult to explain in the light of pre-existing arteriolar relaxation. If no effect is produced, and the condition of the heart warrants it, the advisability of a saline infusion may be considered. Dr. Laslett has recently published in the *Lancet*, a "Report on the Treatment of Diphtheria by Saline Infusions." He recommends the gravitation method. A vessel containing saline solution is suspended over the patient, and the fluid gravitates through a tube and needle thrust into the soft tissues at the side of the breast. The relation of the treatment to lowered blood pressure is obvious, and I have, since reading the article in question, employed it in a number of cases, making at the same time sphygmometric observations. Beyond mentioning elsewhere that in my opinion the treatment, when adopted at a late stage, is not without danger, I do not feel entitled to discuss results, as Dr. Laslett's communication was a preliminary report. His further results should be of great interest.

Dietetic treatment and the prevention of vomiting.—This is of the utmost importance. Persistent vomiting, associated with cardiac dilatation, is with good reason dreaded in severe diphtheria. It is a condition which will tax every resource of the practitioner and also the patient skill of the nurse. The cardinal point is, that the patient is deprived of water as well as nourishment. Vomiting is therefore a potent factor in the causation of anuria. Cases for dietetic treatment may be divided into several classes:—

1. Those in which there is both persistent vomiting and diarrhœa. Here, administration of food and water being impossible, either by mouth or rectum, the only available measure appears to be the subcutaneous infusion or injection of saline solution. I have used repeated small injections (in order to avoid a sudden rise of blood pressure) in one case.

2. Those in which water only is retained by rectum. I generally order one pint of water at blood-heat to be given by the gravitation method, through a soft rubber catheter passed well up the rectum.

3. Those in which nutrient enemata are practicable, while even water by mouth is still rejected. Under such conditions, I commonly prescribe over-zyminised milk or bovril. Four ounces six-hourly is the usual quantity, given in the same way as the water. After twelve hours, or longer, a few drops of water

are tried by mouth, and if retained, the quantity is gradually increased.

4. Those in which a sufficiency of water—say, 5 oz. two-hourly—is alone retained by mouth. Hard zyminised meat suppositories are ordered four-hourly. They are more certain of retention than any of the other kinds I have tried, and are less seldom rejected than the enemata.

5. Those belonging to the last class who have retained several feeds of water. Half an ounce of zyminised milk is added to a feed, an equal quantity of water being withdrawn. The proportion of milk to water is then gradually increased until the patient is taking ordinary zyminised milk, when the suppositories are discontinued. In making a step upwards from water, whey is sometimes used with success. In other cases, junket is given at times as distant as possible from the water feeds. Beyond milk, the first addition is generally Benger's food, which is partly digested during preparation.

It is to be remembered that vomiting in diphtheria tends to persist. When a case is doing well, and some dietetic error induces sickness, it may be necessary to go far down in the scale outlined, before anything is retained, and it may take days to recover the lost ground.

Too much stress cannot be laid on the importance of nasal feeding in severe cases, when the patients do not take sufficient food or fluid. It is not too much to say that every second infant, not nasally fed, receives an insufficient quantity of both. For nasal feeding, a No. 6 soft rubber catheter should be used, with a glass funnel, as in washing out the stomach. The point of the tube should be at least half way down the œsophagus when feeding is commenced. For nasal feeds, milk should always be predigested.

The treatment of paralysis.—Medicinally, very little can be done. Strychnine, by hypodermic injection, is a common prescription, and, later, galvanism is used. When there is difficulty in swallowing, or the patient coughs on or after taking liquids or solids, nasal feeding should be immediately adopted, and continued until the condition has passed away. One other point may be emphasised. During the earlier part of the stage of paralysis, even if it be slight, localised, and stationary, absolute rest should be the golden rule of treatment. There are two reasons for this. First, extension is still possible and may be very rapid. Secondly, there can be little doubt that the nerve degeneration may be wider than is apparent to clinical observation, and undue stress brings out such latent weakness. Thus, on being allowed up, after almost recovering, a patient may have a second and widespread attack. It happens, at times, that a patient becomes nasal after he has been up for the first time—perhaps within a few hours. Again, a single lengthy conversation may cause a nasal voice to become much worse. It is true that slight aggravation follows a night's rest, but this is from disuse of the partly paralysed muscles and soon wears off, unlike the condition caused by over-exertion. The moral as applied to the more dangerous paralysis of the respiratory muscles need not be dwelt upon.

The first few days out of bed, after a severe attack of diphtheria, are the only safe test of complete recovery—not merely because paralysis may yet supervene or recur, but still more owing to the possible persistence of latent heart-weakness. It is a time when over-caution on the part of medical adviser, nurse, and patient is impossible.

SOME OBSERVATIONS ON THE PATHOLOGY AND TREATMENT OF CORNS.

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General Remarks.—A corn may be defined as a small circumscribed overgrowth of the epidermis, appearing commonly on the foot or toe, running a chronic course, and giving rise to considerable pain.

From a surgical standpoint, perhaps, a corn may be considered an affair of small moment, but, from the point of view of the sufferer, matters stand in a very different light; for, in addition to the pain and discomfort to which these little tumours invariably give rise, they often render locomotion difficult and sometimes impossible, and at times unfit the sufferer for performing his duties in life.

Under such circumstances, it is difficult to understand why the treatment of this disease should have been so neglected by *bonâ fide* practitioners of the healing art as to have fallen almost exclusively into the hands of irregular practitioners. To my mind this apathy and indifference is all the more remarkable, as some time ago circumstances led me to study these little tumours in detail, and the work which I have hitherto done in this direction has proved as interesting as it has been instructive, and, as I venture to hope, by no means barren in practical results. This, then, must be my excuse for venturing to offer a few observations on such a very commonplace disease.

Pathology.—The morbid history of a corn may be appropriately studied under the headings of anatomy, histology, and physiology.

Anatomy.—The superficial appearance of a corn must be well known, and needs no special description here. The central cup-like depression, the circumferential raised rolled ridge, the dirty yellow colour, and general lack-lustre appearance should be familiar to even the most casual observer. When, however, one of these growths is completely severed from its surroundings and carefully examined, it is at once apparent that there is much more in a corn than meets the eye superficially. That which is visible on the surface of the skin only constitutes a portion—a minor portion, in fact—of the diseased tissue.

Corns are usually described as being conical in shape; the apex being directed deeply towards the true skin, while the base projects on the surface. This description may be taken as true with regard to growing corns of moderate duration; but it by no means holds good for all, or even for the majority of cases. The fact of the matter is that corns vary much in shape, which is determined to a large extent by their degree of maturity and situation. In the initial phases of its development, a corn assumes the form of a stunted cone, the apex of which projects on the surface, and the base of which, presenting a slightly convex outline, rests on the surface of the true skin. In the so-called "soft" variety of corn, which is met with in the clefts between the toes, this condition of affairs persists throughout the life history of the corn. But in corns of the ordinary type—the so-called "hard" variety—the condition of affairs just described very soon becomes altered, and, indeed, entirely reversed. Still preserving the conical shape, the base, which becomes more or less concave, presents on the surface; while the apex, considerably blunted, projects deeply towards the surface of the true skin. The corn seems to penetrate and become embedded in the subcutaneous tissue, carrying the dermis before it. Corns, when met with in this stage of their development, have been somewhat fantastically likened to nails which have been driven into a board. Hence the terms *Clavus* (Lat. = a nail) and *Clou* (Fr. = a nail), which have been applied to them. As development goes on, yet another change in the shape takes place. All old corns tend to assume a discoid shape, and when associated with the formation of a bursa beneath, approximate more or less to the shape of a bi-concave lens.

But the naked eye anatomy of a corn can be best studied by examining a series of sections cut vertically through the centre of the growth. The surface so produced usually presents a smooth, glistening, waxy appearance, not unlike cartilage; but sometimes appears fibrous and asbestos-like. On close inspection, the cut surface is seen to be marked by numerous parallel vertical striations which traverse the corn from top to bottom. On more minute examination, in the majority of cases, three distinct layers, differing in colour and degree of opacity, can be seen. These are arranged horizontally in a wavy manner throughout the entire substance of the growth. Thin sections mounted in glycerin on a microscope slide, and examined by transmitted light, show the vertical striations and horizontal layers exceedingly well. The deepest of the horizontal layers is usually pearly white in colour, and opalescent. The intermediate layer is yellowish in tint and semi-transparent. The most superficial is also yellowish in colour, but darker, semi-opaque, and of much firmer consistence than the other layers. These layers vary greatly in relative thickness in different specimens. The most superficial layer is always the thickest, except in cases of soft corns, where the surface epithelium is rapidly shed. The intermediate layer is usually the thinnest; it is sometimes indistinct, but more usually well defined. The deep layer, the thickness of which varies greatly, is thickest in actively growing corns of moderate age. The significance of these layers will be discussed more fully when the microscopic appearance and mode of growth come to be considered.

A small fluid-containing sac or bursa is sometimes found in the subcutaneous tissue beneath the corn, but is by no means a constant occurrence. It is an important structure when it exists, and I shall have occasion to refer to it again later.

When a corn is allowed to macerate for some days in a saturated solution of sodium salicylate, it separates into two parts, the line of cleavage being at the level of junction of the superficial and intermediate layers just described. This is an important fact to bear in mind, and, as I shall presently endeavour to show, has a distinct bearing on the question of treatment.

Histology.—Examined microscopically, the normal epidermis is seen to consist of four distinct cellular strata. These, enumerated from within outwards, are—(1) the stratum mucosum; (2) the stratum granulosum; (3) the stratum lucidum; and (4) the stratum corneum. These layers have a distinct physiological significance, in that they represent the successive changes which take place in the formation of keratin, a process which, as every one knows, is the special function of the epidermic cells. Proliferation takes place only in the deeper cells of the stratum mucosum, and, by the constant addition of newly-formed cells deeply, the more superficial ones are forced towards the surface, gradually becoming keratinised as they are pressed upwards, until they are shed, as they were formed, layer by layer. Thus the cells of the epidermis pass through a wonderful metamorphosis, the various phases of which are indicated by the several layers of which that structure is composed. Viewed from this standpoint, the epidermis may be said to consist of—(1) an actively growing layer, the constituents of which exhibits all the phenomena of life; and (2) a grown layer, the cells of which, having fulfilled their destined rôle, are ready to be cast off, and are to all intents and purposes dead. In the living layer must be included the stratum mucosum, the stratum granulosum, and the stratum lucidum, in all of which changes, having for their object the conversion of protoplasm into keratin, are in progress; and in the dead layer the stratum corneum, in which the keratinising process is complete and the cells are waiting their turn to be shed. I have gone into this matter at some length, because, as the sequel will show, it has a very direct bearing on the pathology and treatment of corns.

A thinly cut, well stained section of a corn is as beautiful an object as one can wish to see under the microscope, and presents points of interest which must be seen to be justly appreciated. What strikes one most on examining such a section under a low power is the enormous thickening of the stratum corneum, which often is many times thicker than the whole substance of the skin. Next one sees that there is a considerable and marked increase in the thickness of the stratum mucosum. In actively growing corns, where proliferation is going on apace, this change is especially well marked. The stratum lucidum is always increased in thickness, sometimes not abundantly but distinctly, at other times not so distinctly but more abundantly. The epithelial cells of the stratum corneum are seen to be arranged in vertical columns, which traverse the entire thickness of the layer, and correspond to the papillæ of the true skin on which they are superimposed. These vertical columns are intersected at intervals by horizontal segments, which represent successive periods of growth. In actively growing corns the cells of the stratum mucosum which cap the papillæ are large and numerous, and appear to shoot up finger-like processes into the stratum above. In addition to the changes which take place in the epithelium, certain changes in the true skin are also observed. The papillæ, wherever active growth is going on, whether at the centre or periphery, are elongated; but beneath the central portion of old corns which have reached their zenith they tend to become flattened, and present a squat, stunted appearance. The true skin is atrophied and thin, and often bears distinct evidence of compression, but the blood vessels of the skin and subcutaneous tissue are always numerous and conspicuous in the vicinity of the growth.

One is now in a position to interpret most of the naked-eye appearances of the sections which have been previously described. The vertical striations clearly represent columns of epithelial cells passing gradually towards the surface. The pale horizontal line of variable thickness, traversing the corn in a sinuous manner longitudinally, represents the stratum lucidum, while the layer below and deeper than this line corresponds to the stratum mucosum, and the layer above and superficial to it to the stratum corneum. It is further seen that, when a corn is made to separate into its constituent parts by maceration in a suitable medium, the separation takes place at the junction of the stratum lucidum with the stratum corneum—that is to say, at the junction of the living and dead layers of the epidermis. If this separation be made to take place while the corn is *in situ*, it is manifest that the living growing part of the corn is left behind, ready to grow again on the slightest provocation. To this point I shall again have occasion to refer.

To sum up, in a corn all the layers of the epidermis are more or less thickened, the relative amount of thickening observed in the several layers being dependent on the age, activity, and situation of the growth, but being usually most marked in the stratum corneum and stratum mucosum. In the dermis the papillæ are elongated where active growth is going on, squat and stunted where full growth has been attained. The deeper layers of the true skin and subcutaneous tissue beneath the corn are compressed and atrophied, but contain blood vessels in abundance, which are very evident in the papillæ. In other words, an aberration of structure is observed in all the constituents of the skin, but the overgrowth of tissue, which constitutes the tumour, is confined to the layers of the epidermis, whether formative or formed, and is especially evident in the stratum corneum and stratum mucosum.

Physiology.—The mode of growth of a corn can only be determined by studying a series of microscopic sections which represent collectively the various phases of its individual development. Among the first changes observed is a proliferation of the cells of the stratum mucosum over a limited area—a change brought about, as there is every reason to believe, by nervous influence, and the result of a stimulus directly applied from without to the nerve terminals which govern the nutrition of the part affected. This proliferation of the epithelial cells which surround the papillæ causes these latter to become compressed and elongated; and these changes, together with the great increase in thickness of the layer of epithelial cells capping the papillæ, give to the stratum mucosum the semblance of finger-like processes shooting up into the layer above. This appearance is characteristic of an actively growing corn. The cells of the stratum corneum being directly derived from the cells of the stratum mucosum, any increased production of cells in the latter naturally causes increase in the number of cell elements throughout the entire thickness of the epidermis; and as successive layers of cells are added from below more quickly than they are shed on the surface, the superficial cells become heaped up into a mound-like eminence which projects above the normal level of the skin—a budding corn is produced. As the summit of the mound is the oldest, most highly keratinised, and consequently most brittle part of the embryo corn, and, owing to the fact that from its exposed position it is more liable to attrition, this part of the corn very soon becomes detached, breaking off short just below the level of the surrounding tissue, and leaving a shallow, cup-like depression with a roughened surface. The result of this change is that the chief pressure is shifted from the centre of the corn to the margin of the cup-like depression This, in turn, has the effect of stimulating into activity and causing proliferation of the cells covering a group of papillæ which surrounds the original group. Thus a sheet of hypertrophied epithelium grows up around and tends to envelop the central portion of the corn on all sides, and the superficial layers, in process of time, become broken off in the same way as those of the central portion before them. In this way the maximum pressure is again shifted to a ring of tissue still further removed from the central core; and the process is repeated, again and again, until the corn has reached its acme of growth, and become quiescent. So a corn grows by the constant addition of concentric layers to a central core, and tends to spread centrifugally. This concentric method of growth is rendered apparent to the naked eye by the vertical striations previously described. But the corn grows vertically as well as circumferentially; and, as its growth towards the surface is soon checked by the dense, unyielding structure of the epidermis, it tends to spread in a downward direction—that is, in the direction of least resistance. Hence the stratum mucosum, the thickness of which is being continually augmented, becomes depressed, pushing before it the true skin and invading the subcutaneous tissue.

In the so-called "soft" variety of corn the conditions of growth are identical, although the actual changes which result are somewhat modified owing to the external surroundings. This variety of corn is found in positions where it is continually subjected to the combined effects of heat and moisture, the result of which is that the surface layers are removed almost as quickly as they are formed. Consequently these growths always appear stunted on the surface, and do not tend to invade the underlying tissue to any great extent.

There is practically no limit to the spread of a corn deeply except the underlying bone, but, in order to obviate the ill effects which must necessarily arise from the meeting of two such compact structures as corn and bone, nature comes to the rescue, and by the formation of a little fluid containing sac or bursa in the subcutaneous tissue, interposes a buffer between the deep surface of the corn and the bone beneath. The presence of the bursa soon causes a change of shape in the deep surface of the corn from convex to concave, so that any risk of the corn coming in contact with the underlying bone is doubly obviated. It is not to be supposed, however, that the presence of a bursa is a constant phenomenon in the development of a corn. On the contrary, although it is very constantly found in connection with soft corns of any age, it is very commonly absent in the case of hard corns, unless they are old. Its development would seem to be dependent on anatomical peculiarity, that is to say, the relative thickness of the layer of subcutaneous tissue which exists between the corn and bone. Where the subcutaneous tissue is thin, as is usually the case in positions where soft corns are common, a bursa makes its appearance early; but where the subcutaneous tissue is comparatively thick a bursa forms late or not at all. In some instances, however, it would appear that the formation of the corn is secondary to the formation of the bursa. Thus in the case of the bursa which is so frequently observed over the inner aspect of the metatarso-phalangeal joint of the great toe—constituting what is commonly known as a bunion—it is not infrequent for a corn to make its appearance as a secondary product. But, at times, the bursa, originally intended to be a source of safety, becomes converted into a source of danger; for inflammation and suppuration of this structure is by no means unknown, and, when it occurs, the danger of the inflammatory process spreading to surrounding structures—be it skin, subcutaneous tissue, joint, or bone—is a factor which has frequently to be taken into consideration.

The formation of the bursa and the part which it plays in the life history of the corn are points which are too frequently overlooked, and it is well to remember that the presence of this structure, whether it be defensive or aggressive, is a matter of considerable importance, tending as it very often does to modify the march of events in one way or the other.

Treatment.—The advice usually given with regard to the treatment of corns may be summed up in the three words—"Remove the cause." Theoretically, no doubt, this advice is sound; but, practically, it leaves much to be desired. It should always be borne in mind that among the chief peculiarities connected with the growth of a corn are the persistence with which it grows and its tendency to recur after so-called removal. Once the morbid process which ultimately results in the formation of a corn is set going, it is very readily perpetuated and not easily checked. Even after prolonged rest in bed, which frees them entirely from all risk of being exposed to undue pressure and friction, corns often fail to disappear, and when the patient begins to get about again become just as troublesome as ever. Under these circumstances, it has always seemed to me that the sounder advice would be—"Remove the corn and prevent recurrence." This brings me to the point which I wish especially to emphasise, namely, that if appropriate measures be adopted, any corn may be speedily and permanently cured without any risk of recurrence at all.

The various methods of treatment naturally resolve themselves into three groups—preventive, palliative, and curative.

Preventive treatment.—This naturally consists in adopting such measures as will secure freedom from pressure and friction for the parts which are most liable to corns. To this end a well-fitting pair of foot gear is essential. These should be neither too tight nor too loose, but should sit comfortably on the feet. They should be made of well-seasoned leather, soft and elastic, and be cut to a proper model. The length, width, and height should be sufficient to give full play to the toes, and not to cramp them unduly, either laterally, longitudinally, or vertically. As a rule, boots and shoes should be made to measure, or, what is better, to a last modelled from an actual cast of the foot. If there is a tendency to flat foot or any other slight deformity, this should be taken into consideration in constructing the foot covering, and appropriate means adopted, as far as possible, for its rectification.

Palliative treatment.—Under this heading are included all measures which stop short of the removal of the entire morbid growth, by which I mean the removal of the living and dead layers of the corn together with the bursa, if it exists. These methods of treatment are the ones most commonly practised; and include the application of certain chemical substances to the surface of the corn and sundry instrumental procedures.

Many chemical substances have been employed from time to time in the treatment of corns. Among the older remedies silver nitrate is probably the best; among the more modern, salicylic acid. These remedies act by causing desiccation and shrinkage of the horny layer of the growth, which is thus made to shell out from the bed in which it lies. To secure this, repeated applications of the remedy are necessary, and the process is therefore more or less tedious. Perhaps the best method for securing the partial removal of corns by the application of chemical substances is that recommended by Unna. It is briefly as follows:—A ring of glycerin jelly is painted round the circumference of the corn so as to form a raised rampart. A piece of salicylic plaster mull is then cut to the size and shape of the central depression, and applied to the surface of the corn. This is then covered with a layer of glycerin jelly, and, before it sets, a pad of cotton-wool is applied to the surface. This process is repeated as often as is necessary, until the horny layer of the corn separates and is cast off.

If the point of a sharp thin-bladed knife be introduced at the groove which runs round the margin of the corn, and be made to penetrate towards its central axis, by the exercise of a little manual dexterity the horny part of the corn can be easily made to separate from the parts beneath. This method of removal is one which is much in favour with chiropodists. When separation of the horny layer is brought about by this method, the deep surface of the part removed usually presents an irregular, jagged appearance. This is often triumphantly shown to the patient as a proof that the corn has been extracted "by the roots." The true explanation, of course, is that the vertical columns of cells, previously described, have been irregularly fractured at the level of cleavage. As a matter of fact, a corn has no roots in the ordinarily accepted sense of the word; but if by root is meant the part from which it grows, well, that is left behind. A corn which has been partially extracted by this method has been no more extracted by its roots than a shrub has been rooted up by breaking the main stem short off just below the surface of the ground.

Before leaving the question of palliative treatment, it is well to point out that all these methods only secure the separation of the dead horny layer of the corn from the bed of living tissue in which it lies. Under these circumstances, the removal of the growth is only partial; the essential part of the corn —the part from which it springs—being left behind. This explains the tendency to recurrence exhibited by most corns when treated by the methods in ordinary use. I do not wish for one moment to imply that these measures fail to give temporary relief; but the point on which I wish to lay especial stress is that, for reasons which are sufficiently obvious, they can only yield uncertain results as a means of cure, and are therefore unsatisfactory.

Curative treatment.—As I have previously endeavoured to show, all palliative measures have the common defect that they leave the stratum mucosum—the living, growing layer of the corn—untouched. This, of course, can be destroyed by the application of caustics to the depression which is left after the horny layer has been removed; but it is a method which has its objections, being always more or less painful and uncertain. For the deeper layers of the stratum mucosum and papillæ are very sensitive, and there is no means of gauging the thickness of the strata to be destroyed; nor whether the destruction is complete. Furthermore, the bursa, if existent, is left behind, and may subsequently inflame and give trouble; even if it does not do so at the time as the result of irritation set up by the application of the caustic.

Any method of treatment, then, to be curative must secure the removal of the entire corn together with the underlying bursa. The removal of this latter structure is important, for it is mainly in connection with this structure that complications, which alone make a corn a matter of serious import, are liable to arise. In accordance with these precepts, I have for some time past practised the full and complete excision of corns—a method of treatment which, as the result of accumulated experience based on upwards of sixty cases, I can confidently recommend as efficient.

Such an operation is naturally painful, unless some means be taken to render the parts insensitive. Fortunately there is no class of case in which a local anæsthetic gives more uniformly satisfactory results.

At the outset, let me state that it is just as imperative to adopt antiseptic precautions when operating on corns, as when operating under any other circumstances. He who neglects to make his procedure as aseptic as possible not only errs, but, in the present state of our knowledge, is guilty of culpable negligence. There is good reason for believing that the neglect of these rudimentary precautions is responsible for many of the accidents which occur in connection with the amateur surgery of corns, and that inflammation with its attendant consequences is not infrequently the result of the use of septic instruments with septic fingers on a septic skin.

Having taken every precaution to render the operation aseptic, a spot is selected for the injection of the anæsthetic solution. At this point the skin is rendered insensitive by the application of ethyl chloride, and 5 minims—more or less—of a 4 per cent. solution of eucaine is injected into the subcutaneous tissue beneath the corn. Having waited a few minutes, the superficial parts at the site of the incision are rendered insensitive by ethyl chloride. Anæsthesia is now complete, the process itself being painless, and the operation may be at once commenced. Two hemi-elliptical incisions meeting at their extremities are made through the skin around the circumference of the growth, care being taken that they penetrate well into the subcutaneous tissue. Seizing the parts included in the incision with a pair of dissecting forceps, a wedge-shaped piece of tissue—including the corn, a layer of skin and subcutaneous tissue, and the bursa, if present—is dissected out. The oozing is pretty free, and it is sometimes necessary to torsion a small vessel; but the hæmorrhage is never severe. The edges of the wound are brought together by one or two fine sutures; an antiseptic dressing is applied, and the wound left to heal—primary union in a few days being the rule. Indeed, the rapidity with which the wound heals is often phenomenal. The net result is the production of a layer of scar tissue at the former site of the corn. It might be thought, perhaps, that the formation of a scar on an exposed position, where it was liable to be subjected to pressure and friction, would lead to untoward results; but such in practice is not the case.

The difference between the parts removed by the writer's method and the methods in ordinary use is, that in the former the whole corn, including the bursa, is taken away; in the latter the horny layer of the epidermis alone is separated from the underlying parts of the corn—in the one case, removal is complete and recurrence practically obviated; in the other, the removal is only partial and recurrence more than likely.

Of course, I am quite well aware that in the case of corns dependent on deformity the appropriate treatment of the corns is the treatment of deformity which has called them into existence, the corns being merely by-products or accidents of the main malady. Into this it is obviously impossible to enter here. Nevertheless, the method of treatment which I have advocated can often be advantageously combined with the special treatment indicated for the malformation, and the cure thereby materially facilitated.

To sum up, the chief advantages to be derived from the complete excision of corns are that, as a method of treatment, it is safe, speedy, and painless; while the results, as far as a cure is concerned, are permanent and effected at a minimum of time and trouble.

Conclusion.—I have endeavoured to show that even such everyday objects as common corns may be made a study of considerable interest, which may bear fruit in due season. The corollary to this is, that if practitioners of medicine would take a more intelligent interest in the study of these little tumours, which are as troublesome as they are common, an ever-increasing stream of sufferers would find their way to the consulting room of the surgeon, rather than, as is at present the case, to the sanctum of the chiropodist; and, furthermore, that the treatment of a disease, which legitimately belongs to the domain of surgery, would be gradually lifted from the depths of charlatanism into which it has long since subsided. The moral is obvious—both the profession and the public would be the gainers.

ON MUCOUS DISEASE OF THE INTESTINES.

By Francis Hawkins, M.D., M.R.C.P., *Physician to the Royal Berkshire Hospital, Reading.*

By mucous disease of the intestines I mean that condition of the intestinal canal which results in the passage of mucus in definite cylindrical, tubular, or pellicular forms, associated usually with highly fœtid evacuations with or without hæmorrhage. The term mucous is used because microscopical examinations show that the cylinders, etc., consist merely of mucus, there being no membranous structure; and intestines, because there is no sign that this mucus in its varying forms comes solely from any one part of the intestinal canal, for while there is undoubtedly evidence that some of the tubes and cylinders come from the colon, yet there is no proof that others do not originate elsewhere, and my own observations confirm the opinion of Powell that mucous tubes may come from any part of the intestinal canal. My experience has led me to the conclusion that the results of this disease may assume three forms, which may be regarded as indicating either three distinct types, or three stages of the disease, in the following sequence:—

I. The Cylindrical Type or Stage.—In this form the mucus is expelled in the form of cylinders, or long thin bands, brownish red or pinkish white in colour when first passed, but becoming pale after being washed in water. They frequently resemble the *Ascaris lumbricoides*, and some might be mistaken for segments (proglottides) of *Tænia solium*. In the first case that came under my observation some few years ago, the patient told me she was passing a large number of worms. I insisted on the evacuations being kept, and on first inspection I was almost inclined to agree with her, but further examination led me to regard these so-called worms as cylinders and bands of membrane. Subsequent examination proved that they were mucus. A point of some interest is, that in this type or stage the mucous forms are passed after the fæces—they lie upon the fæcal matter in a mass, or singly by themselves. Litten states that these mucous cylinders are often passed without any fæcal matter, and I have myself met with one such case. These cylinders and bands are often of considerable length; the longest I have seen was fully 10 in. The fæces may be bright in colour or clay-like during the early stage, but later on are dark brown. They are usually offensive, and may be extremely so. Hæmorrhage occurs occasionally.

II. THE TUBULAR TYPE OR STAGE.—The mucus is now passed in the form of tubes, in many instances appearing as membranous casts of the bowel. These tubes vary in length and calibre, those passed in the earlier stage are usually longer and narrower than those passed later. In one case, a tube, 4 to 5 in. in length, resembled in every respect a cast of the jejunum, showing well the impressions of the valvulæ conniventes, while those passed later appeared to come from the colon. Powell states that he has seen them sufficiently long to line the whole of the intestinal canal. These tubes, when passed, are, in my experience, usually of a brownish colour. A patient once described them as "leathery-looking masses." Mason Good, however, describes them as whitish and inodorous; this is so in some cases, but the stools themselves are highly offensive. I have never known stools so offensive as during the passing of the mucous tubes. Unlike the cylindrical forms, these tubes are mixed with the fæcal matter, which indeed may be found within them. The fæces are now usually dark brown in colour, but may be pitchy, formed or not. Hæmorrhage usually occurs, and is more profuse than in the former type. A mere inspection of the fæces will not always reveal this condition, for the tubes being passed with the fæces, it is often necessary to break these up. The method I have usually employed is as follows:—Some water is poured into the chamber, and then the fæcal masses are carefully separated by means of two sticks, and anything suggestive of a non-fæcal mass is floated out, removed to fresh water, and washed. Some are more friable than others, and during this process will break up. Only in this way have I, on two separate occasions, been able to discover the nature of the complaint. If the fæces are, as in some cases, watery, the tubes float out of themselves.

III. THE PELLICULAR[1] OR HÆMORRHAGIC TYPE OR STAGE.—In this form the mucus is passed in pellicles along with the contents of the bowel. These pellicles may also in a measure resemble a proglottis of *T. solium.* Hæmorrhage is frequent and may be profuse; hence I have termed it the hæmorrhagic type. The mucus is usually seen floating; it may now be whitish in colour. The shreds or pellicles vary in length from 1 to 3 or more inches. The fæces are offensive and frequently covered with mucus, either slimy or in slender strings.

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[1] This variety does not include the mucous shreds which are so commonly seen on or passed with the fæces in some cases of constipation.

Symptoms.—There is, so far as I am aware, no one symptom which can be said to be peculiar to this disease (apart from the condition of the fæces), but when any patient complains of great pain, or of feeling faint directly after the passage of fæces, which are offensive, or of passing blood by the bowel, the stools should always be most carefully examined. Powell, in recording four cases of the tubular type, states that in each instance the symptoms led him to expect the passage of biliary concretions. Von Jaksch[1] mentions the case of a patient apparently suffering from chololithiasis, who passed long shreds, which proved to be intestinal mucous membrane. I will allude first to symptoms common to all three types or stages, the most marked being pain. This is generally complained of early. During the course of this disease the pain varies in intensity, but is constant, especially in the tubular type. Bauer, one of the first to discuss this disease, speaks of "the acute pain," and Powell, when describing his four cases, speaks of "painful affections of the intestinal canal." Not only does the pain vary in intensity, but also in situation and character. Hence we meet with—(1) Abdominal pain, which may be general, and either sharp, dull, or aching. One patient now under my care has at times such severe pains that she faints. It may be localised in the region of the gall bladder, or around the umbilicus. Pain may also extend down the legs, giving the feeling of cramp. There may also be complained of "a sore" or "raw feeling inside"; this was constant and localised about the region of the cæcum in one case. In the cylindrical or early stage of the tubular type it may be epigastric; then, later in this latter type, it is over the left iliac region—over the cæcum and the sigmoid flexure. (2) Rectal pain, which comes on with and after defæcation. It is most severe during the passage of the cylindrical forms of mucus, and at the early stage of the tubular, when it is often so great as to cause faintness; in the latter stage of the tubular type, pain is not so severe, but a short time after defæcation there is a great sense of exhaustion. Mason Good, however, states that this rectal pain is constant in the tubular type. It may be so in many cases, but is not constant in all. In the pellicular or hæmorrhagic type pain is frequently complained of, but is never so intense as in the other two.

The abdomen is usually distended in the cylindrical and tubular types, but not, so far as my own observations go, in the pellicular or hæmorrhagic; indeed, in one case when all three types succeeded one another in the order to which I arrange them, the distension of the abdomen disappeared as the hæmorrhagic or pellicular stage was reached. Retching, sickness, and vomiting are common to all types, but neither is present in every case. A feeling of sickness is very common in the tubular type, while vomiting would appear to be more frequent in the cylindrical type. Anorexia is often present at the onset or during the whole course of the disease; in some cases of the tubular type there is a great desire to eat. Pain after eating is frequent in the early stage, and the food is sometimes quickly rejected. Shivers and rigors occur sometimes during the passage of the mucus.

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[1] "Clinical Diagnosis," p. 166.

The tongue in the cylindrical type is very red and dry, and sometimes a slight brown fur appears in the centre, giving it much the appearance so often seen in typhoid. This is also met with in the tubular type. The tongue may, however, be moist and coated, and is usually so in the hæmorrhagic type.

The condition of the bowels as to constipation and diarrhœa resembles much that is met with in fæcal impaction; constipation and diarrhœa following alternately. The bowels may be moved five to six times during one day, and constipated the next. Hæmorrhage with the stools is common to all the types, but is most marked in the pellicular or the hæmorrhagic, when it may be very considerable. The character of the blood varies; it may be dark and quite fluid, or it may be bright red or clotty.

The urine is frequently loaded with urates, and there may be a frequent desire to micturate. In the cylindrical and early stage of the tubular type icterus may exist. Itching may be so troublesome as to cause far more inconvenience to the patient than does the disease itself. As sequels to the tubular type, I have seen eczema and urticaria. Palpitation is very commonly met with. In females the periods are often irregular. In one case there was an attack of bronchitis, for which it was difficult to account; it would appear to have been allied to the bowel trouble. Hæmoptysis occurred once in one of my cases, and it was also observed in a case recorded by Mr. Hutchinson.[1] The duration of this disease appears to vary in different individuals. It may last for months, and then cease, and in other cases it may become chronic, with scarcely any remissions.

Prognosis.—The prognosis must be guarded, for while the disease is recovered from for a time it is very liable to recur. In one case under my care the disease has existed for years; sometimes cylinders, sometimes tubes, and sometimes pellicles of mucus are passed. This condition has, I know, existed with only slight remissions for many years. Within the last eighteen months this patient has developed pulmonary tuberculosis; she is about 40 years of age. The pellicular or hæmorrhagic type or stage may be prolonged and very severe; it may be the terminal stage; considerable quantities of blood may at times be passed. In no case coming under my own observation have I known of a recurrence. I know of one case—a man—where the pellicular stage succeeded the tubular; a considerable quantity of blood was passed at varying intervals, and pellicles of mucus were constantly present in the stools. The patient was thought to have tuberculous disease of the colon, and was discharged from the hospital as incurable; but after having been thus ill for nearly a year he began to get better, and, from inquiry made on my behalf, I find this man is now quite well and still following his ordinary occupation. Since the onset of his illness eight years have elapsed, and during the past seven he has been perfectly well.

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[1] *Trans. Path. Soc. London*, 1857.

Treatment.—It is important to attend to the diet and general hygiene. The food must be easily digestible, nutritious, more solid than liquid, and should be taken in small quantities, with three if not four hours between each meal. I have known beef-tea and soups cause much discomfort. Stimulants are beneficial in some cases, but on the whole the patient is, I believe, better without. The late Sir Andrew Clark, who was much interested in this disease, recommended cold baths, and these were certainly useful in one case in which I had the advantage of his experience. Their use must, however, be limited to the cylindrical and tubular types. In these, exercise also is sometimes beneficial. There is no reason why it should not be taken if the patients are well enough in themselves. I have, however, known cases in which exercise increased the pain. One lady told me that walking produced a sensation like knives running into her abdomen, and immediately brought on retching. In the hæmorrhagic type the patients are best in bed. As a rule, the patients are extremely irritable, and it is difficult for them to appreciate the advantage of resting in bed.

The bowels must be kept regular in all types or stages; especially is this necessary in the cylindrical and tubular, but unfortunately many patients dread the act of defæcation, as it causes such pain. One case under my care some few years back fell off the seat in a dead faint immediately after defæcating. I have in some cases given, during the passage of the tubes, rhubarb and soda with much benefit.

Glycerin suppositories are also useful. Enemata may be necessary. Calomel in small doses appears to render the fæces less offensive. The abdominal pain is sometimes difficult to alleviate. Warm fomentations are useful with opium or cannabis indica, with belladonna internally. This may produce constipation, and thus such remedies must be used with great care. Morphine injections are then preferable.

Later in the disease bromide of potassium combined with iron seems in some cases to be of use; and in others quinine, arsenic, and strychnine are most beneficial. In the hæmorrhagic type, pil. plumbi c. opio has been useful. I have tried washing out the bowel by injections, but do not think any real benefit resulted. The patient objected much to this procedure. In 1895 a case was read before the Clinical Society by Dr. Hale White and Mr. Golding Bird, in which the colon was opened on the right side; the patient benefited by the operation, but died subsequently. Mr. Skene Keith has also performed colotomy in one case, and the patient improved. Mr. Mayo Robson had a similar case, which did well. It is, however, difficult to persuade patients to submit to operation. One patient whom I advised to be operated upon immediately ceased coming to see me, and another similarly objected. Yet both considered that life was not worth living when they suffered from such severe pain.

Etiology.—The tubular type is more frequent in women, the hæmorrhagic type more frequent in men. I have only known one case occurring in a patient under 25. That was in a boy æt. 6, who passed mucous cylinders about 2 in. to 3 in. long. Loos describes a case of the cylindrical type in a child 2 years old, and Da Costa in a boy of 8, who had for some time been treated for worms. So far as females are concerned, all cases under my observation have been decidedly neurotic, and the same may be said of one or two males who have suffered from the hæmorrhagic type.

Two cases seen not long since at the hospital—both males—were employed in an iron foundry, working with tools the use of which involved pressure against the abdomen. One man told me of others engaged in the same department who had a similar complaint.

Pathology.—Microscopical examination of these varying forms shows them to be, as I have before said, mucous. The late Sir Andrew Clark[1] says: "The casts are not fibrinous, and . . . *they are not the products of inflammation* in the sense defined." Few, if any, persons die from this disease, hence its morbid anatomy is practically nil. Abercrombie reports the case of a lady, æt. 18, who died from pulmonary tuberculosis about three months after she had been passing long, stringy matter, and frequently distinct *tubes.* At the autopsy the mucous membrane of the colon was thickly covered with spots of a clear white colour; all were vesicles, a very little elevated, which when punctured discharged a small quantity of clear fluid. Sir James Simpson refers to a case of chronic pellicular discharge when, at the autopsy, the mucous membrane of the colon and lower portion of the small intestine was everywhere studded with a thickly set papular eruption. Hale White mentions one that died some time after any membrane had been passed, where the colon was thin, and covered with slight patches of congestion. Leube says that the disease commences in isolated patches. The membrane extends laterally along the mucous folds in the intestine, and in the colon upon the ileo-cæcal valve, and the folds of the sigmoid flexure.

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[1] *Trans. Path. Soc. London*, vol. ix. p. 193.

Literature.—In nearly all our text-books—I might say in all—this disease is dismissed with a few lines as being rare; doubtless it is seldom observed, not because the condition does not exist, but because the stools are not examined. The cylindrical type is treated as worms, and the hæmorrhagic as due to hæmorrhoids; once I have seen it mistaken for typhoid. The disease has been known for certainly the past one hundred and fifty years. In 1747, M. Bauer, in a letter to M. de Hahn, gave notes of cases of the tubular type. Paulus Spindler recorded a case which apparently approached more to the cylindrical type; he described the discharges as "longa compacta, albicantia." In 1787 this disease was described by Kampf, a Dutch physician. Dr. G. D. Yeats, in the Goulstonian Lectures, delivered before the Royal College of Physicians of London in 1817, spoke of "evacuations of a dark colour with the addition of much mucus." Six months later in the same year, Dr. Richard Powell read before the college a paper entitled, "On Certain Painful Affections of the Intestinal Canal," and he proceeded to narrate four cases of the tubular type. This was the first description in English medical literature. Subsequently Cruveilhier described it under the title, "Enterite pseudo-membraneuse." Mason Good, in 1825, spoke of it under the term "Diarrhœa Tubulosus." He says: "This condition is not often described, but is frequently met with in practice." Abercrombie, in 1826, described a case under "Diseases of the Mucous Membrane." Andral also alluded to the disease. Dr. T. I. Todd of Brighton described it under the name of "Follicular Duodenal Dyspepsia." Sir James Simpson read a paper before the Medico-Chirurgical Society of Edinburgh on "Chronic Pellicular or Eruptive Inflammation of the Intestinal Mucous Membrane," mentioning a case of the tubular type, and stating that the condition was frequently considered by patients as *worms.* He also adds: "All, I believe, are now willing to acknowledge that it (this condition) is infinitely more common than the total, or almost total, silence on the subject, of our best writers on practical medicine would *a priori* lead us to infer." Mr. Hutchinson, in 1857, showed a tubular cast at the Pathological Society of London. Dr. James Copland (1858) gave a description of the disease, under "Pseudo-Membranous Enteritis." The late Sir Andrew Clark wrote upon the disease, under the name "Mucous Disease of the Colon," as did Whitehead of Manchester. Da Costa, in 1871, describes it as "Membranous Enteritis." Goodhart exhibited a specimen illustrative of the disease in 1872. Pye-Smith read a case before the Pathological Society of London, where mucous casts were passed in a case of cancer of the colon; and other writers have since described it.

NOTE ON EARLY VIVISECTION IN EDINBURGH.

By D. FRASER HARRIS, M.D., *Lecturer on Physiology and Histology, University of St. Andrews.*

I SHOULD like to be allowed to revert to the subject of the earliest experiments on living animals in Edinburgh, alluded to in my lecture on "John Reid," published in this Journal, November 1900.

Much depends on what we precisely mean by "experiments" on animals, for if any kind of human interference with the liberty of an animal is an "experiment,"—if, for instance, starving or hypnotising is an experiment,—then neither Reid's nor Whytt's were the earliest. Professor Robert Whytt's book[1] was published in Edinburgh in 1751. Dr. Charles Alston, Professor of Botany and Materia Medica in the University of Edinburgh, administered opium to frogs and dogs in the "Physic Garden at Holyrood" in August 1733.[2] Alston and his "colleague, Mr. Monro," and a Mr. Robert Fullarton, also examined under the microscope the webs of these opium-poisoned frogs. Alston made post-mortem examinations on the animals, but, as far as appears in his writings, no dissections on living animals (vivisections) were performed.

The curious research of Edward Stevens, printed in 1777, as his M.D. Thesis,[3] and dedicated to Alexander Monro, was done in Edinburgh. He utilised the services of a juggler, who swallowed perforated metal balls filled with meat, which, on being regurgitated, were found to have the meat more or less digested out of them. Stevens also caused dogs to swallow similar balls filled with sponge, which, on being withdrawn, were found to have the sponges soaked with gastric juice. Stevens describes at least twenty-five "experiments" in the paper, and is believed to have been the first to conduct artificial gastric digestion—digestion *in vitro.*

The order of experiments on animals in Edinburgh before Reid would therefore be—Alston's, 1733; Whytt's, from (say) 1740 onwards; Steven's, from (say) 1770 onwards. If, however, by "experiment" we mean vivisection in its strict acceptation, and confine ourselves—as I did implicitly in the lecture on Reid—to vivisection on warm-blooded animals, very often without any drug administered to them, then, I think, remembering these conditions, that Reid's experiments (1836) were the earliest in Edinburgh.

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[1] "An Essay on the Vital and other Involuntary Motions of Animals."

[2] "Medical Essays," Edinburgh, 1742, vol. v. pt. i. p. 153. He reports that Mr. Monro injected opium into the crural vein of a dog.

[3] "De alimentorum concoctione."

CLINICAL RECORDS.

MULTIPLE LESIONS OF THE BRAIN: A RECORD OF THREE CASES.

By LUDWIG FREYBERGER, M.D., M.R.C.P., *Barrister-at-Law, Pathologist, Great Northern Central Hospital, London.*

IT was my good fortune, as pathologist to the Great Northern Central Hospital, to make post-mortem examinations on three cases of multiple brain lesions, which possessed such a number of interesting points, both during life and on the post-mortem table, that they deserve wider publicity. How uncommon these multiple lesions are, may be seen from the fact that they are the only ones that occurred out of a total of 4000 post-mortem examinations.

CASE 1.—Mrs. P., æt. 43, was admitted on February 14, 1898, under the care of Dr. E. Clifford Beale, suffering from dementia, defective vision, and albuminuria. The relations who accompanied her stated that on December 20, 1897, the patient had been seized with violent headache, and that shortly afterwards she became unconscious. They also noticed twitching of her face and of her right arm and leg. The unconsciousness lasted about two hours, but the headache and a general weakness persisted for three days. The friends were quite sure that there was no paralysis. A doctor was called in, who found the urine loaded with albumin. A week after the seizure the patient got up and walked about.

On February 7, 1898, that is fifty-three days after the first illness, the patient for the second time complained of intolerable headache, and vomited freely. Her friends again noticed violent convulsive spasms of the muscles of the face and of the right upper and lower extremities, but there was no loss of consciousness, or paralysis. The patient, however, became delirious, and was continually screaming and shouting, so that her removal to a hospital became necessary. Both parents and a brother of the patient had died of nephritis.

The patient on admission was in a marked state of dementia. She screamed and shouted without stopping, but answered questions sensibly enough. Her acuity of vision was so much reduced that she could not count fingers; the optic discs were blurred and œdematous; but there were no retinal hæmorrhages. At the apex of the heart was heard a loud systolic murmur, the second aortic sound was ringing. The urine contained much albumin. The temperature was subnormal.

On March 17, that is twenty-eight days after the second attack, the patient was sitting up in bed having her dinner, when she suddenly fell out of the bed and struck her head on the floor. When picked up she was conscious, and stated that she felt giddy and fell over the side of the bed. It was noticed that the left side of her face did not move when she spoke. Half an hour later the patient suddenly became ashy pale and cyanosed about the lips. Unconsciousness supervened, accompanied by all the symptoms of complete left-sided hemiplegia. Death took place eight hours later.

At the post-mortem examination, besides eburnation of the bones of the cranium and universal atheromatosis of the arteries of the brain, the following changes were found:—The convolutions of both cerebral hemispheres were flattened, there was well-marked, deep-seated fluctuation on palpation. On section, a firm, dry, amber-coloured blood clot was observed in the right temporo-sphenoidal lobe, of the size of a large date, which was firmly adherent to the surrounding brain substance. The white matter around it was somewhat moister and straw-yellow in colour; it was found to contain numerous hæmin crystals. A second clot, almost as large as a Tangerine orange, of a gelatinous consistence and a greyish brown colour, was situated in the substance of the left occipital lobe. Its posterior pole was in close proximity to the calcar avis. This clot was only slightly adherent to the surrounding brain substance, which, from imbibition of blood colouring matter, had become markedly pink. In the right hemisphere, immediately in front of the clot, and separated from it by a narrow strip of brain substance less than ½ in. thick, was found the third and by far the largest clot. The hæmorrhage which gave rise to it had occurred in the lenticular nucleus, and had destroyed this and portions of the caudate nucleus, the optic thalamus, and internal capsule, besides reducing to a pulp a considerable portion of the substance of the frontal and parietal lobes. This clot was quite recent, and consisted of loosely coagulated blood, in colour and consistence resembling black-currant jelly. It weighed close on 5 oz. The heart and kidneys showed the changes consequent on chronic parenchymatous and interstitial nephritis.

Case 2.—Mr. G. C., æt. 49, was admitted in a drowsy condition on December 29, 1900. The previous history of this case is very scanty. All that could be ascertained was that since last September the patient had, without interruption, suffered from severe headache, and further that he had been losing flesh since. At the beginning of the month of December he took to his bed, on account of general weakness; he vomited occasionally after food, and was at times unconscious. The family history was exceedingly good; the patient had not had syphilis.

On admission the patient was in a state of great emaciation and heavy drowsiness, but could be sufficiently roused to answer some simple questions; this he did in a slow and halting manner. The pulse was slow, of medium tension; the temperature 1½° to 2° F. below normal. Cerebration was exceedingly slow; all acts were delayed and left incomplete; the memory was apparently fair; the grip in both hands was weak, but equal. There was neither paralysis nor rigidity. Pin-pricks were felt indistinctly. The knee-jerks were brisk; the pupils contracted, but equal; their reaction to light and accommodation sluggish. The external ocular muscles were not paretic. Nothing abnormal was noticed with regard to the other organs. The patient continued about the same during his stay in the hospital, occasionally passing his motions under him, not from any want of control over his sphincter, but simply because he asked too late. On January 3, 1901, at 2.45 P.M., after his visitors had left him, there was a sudden change for the worse; his breathing became laboured, and soon assumed the Cheyne-Stokes character. The patient died within fifteen minutes.

At the post-mortem examination the convolutions of both convexities were found flattened; there was deep-seated fluctuation on the left frontal and occipital lobes; an irregularly-shaped, dark slate-coloured tumour, in size and shape resembling a small apple, was seen to occupy the anterior two-thirds of the upper half of the right cerebellar hemisphere, penetrating far into the cerebellar substance. On capping the hemispheres horizontally, about ½ in. above the corpus callosum, a cyst was found in the white substance of the left occipital lobe, that measured 1¼ in. across, and contained thin, prune-juice coloured fluid; it apparently possessed no capsule of its own, but its cavity was lined by compressed, discoloured, and infiltrated brain substance. To the naked eye this cyst appeared to be a simple hæmorrhagic cyst, but microscopical examination of the cyst wall showed it to have been caused by a hæmorrhage into a glioma, which led to the disintegration and colliquation of the new growth. Another, somewhat smaller, gliomatous deposit was found in the white matter of the left frontal lobe. It measured about 1 in. in diameter, was of a slaty-grey colour, and was sharply marked off the surrounding brain substance. Its central part had become necrotic, and formed a viscid semifluid substance, which was intimately mixed with a crumbly débris of glioma substance. This tumour and the previously described cyst were situated above the lateral ventricle, with which they did not communicate. The cerebellar tumour was also a glioma; between it and the underlying cerebellar substance a small recent blood-clot was found. The rest of the brain and the other organs of the body were healthy.

CASE 3.—Mrs. J. K., æt. 39, married, was admitted on September 24, 1898, under the care of Dr. Syers, complaining of pain in the abdomen and joints.

The patient was thin and pale, with a systolic murmur heard loudest over the base of the left ventricle. In the abdomen, about 3 in. above the navel, an oblong tumour was felt extending transversely across the spine; it was immovable and tender on pressure. The liver and spleen were enlarged, hard, and tender. The urine contained no abnormal constituents. Epithelioma of the pancreas was diagnosed.

Two days after admission, the patient while in bed suddenly vomited and complained of griping pains in the abdomen. A few moments later she became aphasic and paralysed on her right side, but remained conscious. There was a slight rise of temperature for the next few days. The power of speech gradually returned, but the hemiplegia remained unaltered. On October the 9th, the patient suddenly became stuporous, and remained in this state until death. Death took place at the end of nine hours.

At the post-mortem examination, the bones of the skull were found almost double their normal thickness and of ivory consistence; the dura mater could not be separated from the vitreous table; there was also much thickening of the pia arachnoid. At the point where the *left* middle cerebral artery sends off three branches for the convolutions of the island of Reil and the operculum a small reddish grey embolus was lodged. To its proximal end a thrombus was attached, which was continued upwards as far as the origin of the frontal branch of the middle cerebral artery. The clot was firmly adherent, greyish brown of colour, almost dry and friable. In the *right* middle cerebral artery a reddish grey embolus was found, the size of a barley-corn, which had become lodged at a spot some distance in front of the primary ramification of the artery. This embolus was continued centripetally by a recent dark red thrombus, which for a distance of ½ in. completely blocked the lumen of the vessel, and whose tapering end reached as far as the origin of the right anterior communicating artery. Beyond the emboli both arteries were empty and contracted. The emboli had been washed off some recent endocarditic vegetations on the mitral valves. There was a large primary cancer of the middle portion of the pancreas and numerous metastatic deposits in the liver.

These cases are interesting from three points of view—

Pathologically, Cases 1 and 2 are chiefly remarkable on account of the number and size of the brain lesions which were found on post-mortem examination, and on account of the great tolerance which the brain exhibited in both instances when there must have been a serious increase of intracranial pressure; whereas Case 3 commands our attention, because it shows a very rare instance of multiple brain lesion, namely, embolism of both middle cerebral arteries.

Clinically, the cases are interesting, because the symptoms during life did not lead one to suspect the presence of anything like the extensive lesions which were found post-mortem. What were the symptoms which in Case 1 the patient exhibited after the first extensive hæmorrhage? Headache, unconsciousness lasting two hours, and muscular twitchings, but no paralysis. Yet the quantity of blood effused must have been considerably over an ounce. And after the second hæmorrhage? Again headache, spasm, but no motor paralysis; the only paralytic lesion that could be found was hemianopia, and the only functional disorder a demented state. Yet this second clot was much larger than the first. It was only after the third attack, when over 5 oz. of blood were poured into the brain substance, that hemiplegic symptoms and coma supervened.

If Case 1 is a good example of the adaptability of the brain to rapid increases of the intracranial pressure, then Case 2 is remarkable as a specimen of the brain's tolerance of slowly increased pressure. In this case the growth of the tumours was spread over several months. For four months the only symptoms which troubled the patient were constant headache and loss of flesh; it was only four weeks before death that his muscular power rapidly declined, and only towards the end of this period cerebration became slow, in consequence of an extreme degree of intracranial pressure; sluggish reaction to light and accommodation of the contracted pupils were also present, but paralysis or spastic rigidity were completely absent. Yet the patient had three tumours in his brain, each the size of a small apple, into one of which a hæmorrhage had at some time taken place, transforming what was once a solid tumour into a cyst; but none of his friends had had occasion, when this happened, to notice any change in his general condition. How great the intracranial pressure must have become is shown by the fact that, ultimately, a trifling hæmorrhage of less than two teaspoonfuls sufficed to raise the pressure to such a height that the functions of the brain could no longer continue.

In Case 3 the patient was only temporarily aphasic, but permanently hemiplegic after the embolism of the left middle cerebral artery; but when the right middle cerebral artery was also blocked, the condition became at once one of complete general paraplegia and deepest coma.

Great is the medico-legal interest of the first and third cases, because both cases give us an opportunity of not merely approximately determining the ages of the various lesions from the appearance of the blood clot.

In Case 1, where all the clots are exo-vascular, we find that the clot that is eighty-one days old is firm, dry, amber-coloured; it adheres almost inseparably to the surrounding brain substance, which is of a yellow straw colour, and under the microscope shows embedded many hæmin crystals; the clot whose age is twenty-eight days is larger, gelatinous, greyish brown, adheres only slightly to the surrounding brain substance, which possesses a pink hue; the most recent clot, only eight hours old, is very large, consists of loosely clotted blood, and is not adherent at all; in appearance and consistence it resembles black-currant jelly. In Case 3, where we have to deal with endo-vascular clots, we find that the first embolus, fifteen days old, is greyish brown, and together with the accompanying embolic thrombus adheres so firmly to the inner coat of the artery that it crumbled to pieces when the artery was split open and flattened out; whereas the second embolus, which is only nine hours old, is reddish grey and looks like a barley-corn lying loose in the artery, to it is attached a thrombus consisting of freshly clotted, dark brown-red blood, of a gelatinous consistence which is nowhere adherent to the vessel wall. As a contribution to our knowledge of the changes that take place in endo- and exo-vascular cerebral blood clots as time goes on, these two cases have great practical value. Case 2, on the other hand, exhibited symptoms which closely resembled narcotic poisoning, the state of the pupils specially reminding one of the condition which is frequently observed in persons who are recovering from an overdose of laudanum.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

Memoirs and Letters of Sir James Paget. Edited by STEPHEN PAGET, one of his Sons. London: Longmans, Green, & Co. 1901.

SIR JAMES PAGET filled for nearly half a century so high a place in his profession and in public estimation, that it is but right that a record of his life and work should be preserved in a permanent form. The duty of preparing a biography of his eminent father has been entrusted to the youngest son, who himself is a hospital surgeon, and who has already shown a capacity for writing the lives of distinguished members of his profession.

The material at Mr. Paget's disposal consists in part of Memoirs written by Sir James between the years 1880–85, and in part of letters to members of his family and to private friends, and these are linked together by a commentary which includes the personal reminiscences of the biographer. Mr. Paget has done his work with much judgment and good taste, and has brought his father's life into the compass of a volume of 438 pages.

As might be anticipated, the most interesting section, occupying nearly half the book, is the Autobiography, in which Sir James describes and comments on the chief incidents of his career from 1814 to 1851, and concludes with some observations on his position as a practitioner subsequent to the latter date.

Paget's account of his early life, of the difficulties which he had to overcome from want of means and influential connections, of his struggle to break down the conservative forces then paramount at St. Bartholomew's Hospital, which precluded from holding surgical appointments all students of the school who had not been either apprentices to the hospital or to one of the surgeons, is a narrative of great interest, and is told with much candour and simplicity of statement.

Born at Great Yarmouth in 1814, James was the twelfth child and fifth son of Samuel Paget, banker, brewer, and shipowner, and Sarah Elizabeth Tolver. He writes of his father and mother in terms of great affection and respect. In his early boyhood the family had been wealthy, and had held an influential position in the town, but his father had begun to lose money when James was thirteen, and could not afford to send him to the public school where his older brothers had been educated. He became the head boy of the private school which he attended, but it was not of the grade to enable him to acquire a classical taste or to come under the influence and appreciate the merits of the ancient writers.

After an abortive attempt to enter the navy, for which he admits that he was eminently unfitted, it was decided that he should be a medical practitioner, and in accordance with the custom which at that time, and for many years afterwards, prevailed in England, he was apprenticed, at the age of sixteen, to learn the art and mystery of a surgeon and apothecary. His apprenticeship lasted four and a half years, during which time he acquired the art of compounding and dispensing, account keeping, and the business-like habits needed for practice, as well as neatness and cleanliness in minor surgery. He also gained a knowledge of the bones, had some opportunities of dissection, read a good deal of medical literature, and taught himself to translate French with accuracy. He collected plants and studied the botany of the district, and along with his brother Charles published in 1834 an account of the natural history of Yarmouth and the neighbourhood. The entomological part was written by Charles, and James was responsible for the rest of the book. In the reference in the Memoirs to this his first published work, he comments on the influence of the study of botany on the course of his life. "It encouraged," he says, "the habit of observing, of really looking at things and learning the value of exact descriptions, it educated me in habits of orderly arrangement. My readiness to work patiently in museums, and arrange them and make catalogues; the unfelt power of observing and of recording facts—these and many more helps towards happiness and success may justly be ascribed to the pursuit of botany." Surely no stronger testimony of the value of botany as an aid to accuracy of observation and method, qualities of such paramount importance to the medical student and practitioner, could be adduced.

One of the most interesting chapters in the Memoirs is the description of the state of medical education at St. Bartholomew's when Paget entered as a student in 1834. When we compare the condition of education at that time in Edinburgh with that which existed in one of the best hospital schools in London, we see how much in advance Edinburgh was, both in the subjects and range of teaching and in the opportunities given to the student.

Paget applied himself with characteristic energy to his work during the two years then required for study in a medical school. Each year he gained the first place in all the classes he attended, and he was recognised both by teachers and fellow-students as a man of great ability and marked out for future distinction. He became a Member of the Royal College of Surgeons of England in May 1836, at the age of 22. Owing to the heavy fees at that time required from the dressers and house surgeons, Paget was unable to act in either of these capacities, with the result that the future Senior Surgeon to the hospital had never filled the junior appointments which are usually regarded as essential to success in surgical practice.

After obtaining his diploma, Paget spent three months in Paris, and then returned to London to wait his time for appointments and practice. He was now thrown on his own resources for the means of living, and he tells us that he wrote for some of the medical journals, for the

"Penny Cyclopædia" and the "Biographical Dictionary." The literary work in which he was engaged made it incumbent on him to be able to translate not only from French, but from German, Dutch, and Italian, and he acquired facility in reading medical works in these languages. Although he worked hard with his pen, the income from its use was so small that he had to exercise the greatest economy, but his literary connection had the advantage of bringing him into personal relation with influential men outside his hospital.

In 1837 a small appointment in the Medical School of St. Bartholomew's became vacant, that of the Curator of the Museum, and his acceptance of the office may be said to have determined the character of his professional work for many years to come. It made him a thorough student of morbid anatomy; it led to a demonstratorship on that subject; it gave him the reasons and means of writing a new edition of the catalogue of the museum, which in its turn led to his employment to write the "Pathological Catalogue of the Museum of the College of Surgeons," and subsequently to the Professorship in that College.

It was Paget's lot to begin his professional life in London at a time when the improvements in the microscope had placed in the hands of investigators an important instrument of research, and when the far-reaching generalisation of Schleiden and Schwann had given a unity to biological conception such as had not previously been possible. Paget had the ability and insight to recognise the value of the microscope in pathology, and his knowledge of modern languages enabled him to keep pace with the investigations of continental writers on normal and morbid histology. By his annual report on the "Use of the Microscope in Human Anatomy and Physiology between 1842 and 1846," by the original investigations which he made on morbid growths and conditions, by his demonstrations and lectures at St. Bartholomew's, and by his lectures delivered at the Royal College of Surgeons of England between 1847 and 1852, Paget acquired a great reputation both as an observer and thinker, and he became recognised by his brethren at home as one of their scientific leaders. When his lectures on Surgical Pathology were published in 1853, they at once took the place of a standard treatise, and they placed their author in the first rank of pathologists both at home and abroad. Notwithstanding the changes which have taken place in pathological conceptions, due to improvements in methods of research and the consequent additions to our knowledge through the inquiries of swarms of investigators during the past half century, Paget's lectures continue to be read with profit; the clearness of description of morbid appearances, naked eye and microscopic, obviously written from the objects themselves, the methodical arrangement of the matter, the abundant evidence of thought and care in their composition, the literary quality of the style, often rising to eloquence, have given them a permanent place amongst medical classics.

The reputation which Paget was gradually acquiring necessarily affected his position at St. Bartholomew's, and, when it was decided by the authorities of the school to separate the teaching of descriptive anatomy from that of microscopic anatomy and physiology, led to his appointment in May 1843 as Lecturer on General Anatomy and Physiology, in August of the same year to be Warden of the newly created Hospital College, and in 1847 to be Assistant Surgeon. In 1844 he married, after an engagement of eight years, the lady who was the source and sharer of his domestic happiness.

Prior to Paget's appointment as a lecturer, the medical school at St. Bartholomew's had been steadily declining, but under the influence of his character and teaching the entry of new students doubled in number, and the school regained its place as one of the first in London. As an expositor of a difficult branch of medical science Paget was *facile princeps.* His untiring application made him conversant with the progress of his subject in all its details; his quick apprehension of the value of recorded observations, tested daily by his own researches, enabled him to impress on his pupils the facts of primary and to discriminate those of only secondary importance; his orderly mind marshalled the facts in logical manner; the keen, eager face, the bright, penerating eyes, his facility in speaking, his choice of language, and the charm of his delivery, presented the subject so as at once to attract and fix the attention of the large class of students. But in addition his pupils felt that he was earnest in his work, that he was interested in them as individuals, an interest which showed itself both in the words of encouragement which they received during their pupilage, and in the support which he gave them at critical stages of their career in after life. Many will recollect and treasure the kindly look, the warm greeting, the affectionate shake of the hand, which they received on meeting him, even years after they had left the school.

Paget's lectures to his students were much more than verbal expositions. He recognised the importance of appealing to the eye as well as to the ear, and of cultivating and stimulating the power of observation of the class. He exhibited numerous diagrams, and as he expounded his subject he utilised his skill as a draughtsman by drawing freely on the slate. In his lectures on morbid anatomy he showed and described recent specimens from the post-mortem room, and he emphasised the importance of describing from the objects themselves, and not from a recollection of their appearance. He demonstrated the structure of the tissues and the circulation of the blood under the microscope. The phenomena of circulation of the blood were practically illustrated. His lectures on the heart were timed to correspond with some great turtle feast in the City of London, and the huge reptile, reposing on the lecture table, was made the medium of demonstrating the movements of the heart before being converted into soup to tempt the palate of the citizens. The peristaltic action of the intestines, the presence of chyle, its absorption by the villi, its transmission by the thoracic duct, the presence of non-striped muscle in the coats of the blood vessels, the difference in the character of the contraction of striped and non-striped fibre, were all demonstrated in the lecture room more than fifty years ago, long before classes of experimental physiology were organised, and became special courses in medical education.

During the years when Paget was acquiring his reputation as a teacher and pathologist he had made no progress in private practice. He tells us that during the first seven years after obtaining his diploma his largest income from this source was £23, 13s., and that it had never exceeded £100 till he had been a surgeon for sixteen years. From his appointment in 1847 as Assistant Surgeon to the Hospital he had been gaining experience in practice, and in 1851 he resigned the Wardenship of the College, and commenced in the West End of London. His success was gradual, and in the course of years his income increased till it exceeded £10,000, though when he gave up operating it fell to £7000.

His career from 1851 onwards is sketched by his son, and we read of his rise in professional and public estimation. He was elected Fellow of the Royal Society of London in 1851. He became full Surgeon to the Hospital, and Lecturer on Surgery, positions which he resigned as the burthen of private practice became more severe; he was chosen on the Council of the College of Surgeons, and in course of time became President; he was Member of Senate and afterwards Vice-Chancellor of the University of London, and President of many of the societies associated with his profession; but the greatest professional distinction which he received was his selection as President of the International Medical Congress, when it met in London in 1881. His position as a representative man was recognised by his being elected an Honorary Fellow of many scientific societies, both at home and abroad. Several universities conferred on him honorary degrees. He sat for some years as the representative of the College of Surgeons on the General Medical Council, and he was a member of more than one Royal Commission, more especially that on Vaccination, which sat for seven years, and on which he repeatedly acted as chairman. His professional distinction naturally connected him with the Court. As early as 1858 he was appointed Surgeon Extraordinary to Queen Victoria, in 1863 Surgeon in Ordinary to the Prince of Wales, and in 1887 Sergeant Surgeon to the Queen.

As a consultant Paget's opinion was highly appreciated. He was more than a surgeon. His physiological and pathological studies had given him a keen insight into diseased conditions and processes, and his advice and opinion were sought in a class of cases which do not usually come under the notice of surgeons. His name is now permanently associated with the diagnosis of various morbid processes, which had not previously been properly discriminated, and his son would have added to the value of the Life if he had given, for purposes of reference, a list of his father's published writings in an appendix to the volume. Paget's influence over his patients was due not only to their recognition of his professional ability, but to his gentleness and kindness, and to the sympathy which he showed in their suffering.

His grace and readiness as a speaker, and the judgment and wisdom displayed in his public utterances, led to many demands on his time to deliver addresses to professional or scientific bodies. In his Memoirs he states that he never spoke on any considerable occasion without careful preparation. For important addresses every word was selected long before, and sentence by sentence committed to writing and learned by heart, and yet such was his aptitude that his auditors had the impression that though the matter of the address had evidently been carefully considered and thought out, the phraseology was to a large extent spontaneous, and under the influence of the occasion.

Mr. Paget favours his readers with a delightful picture of his father's domestic life, with the perfect cordiality of the relations between parents and children, and, when success attended his professional efforts, with the happy vacations they all spent together visiting places and objects of interest either at home or abroad, and with the pleasure he derived from the society of his friends. There can be but one opinion formed after the perusal of the volume edited by filial piety, that it is a faithful record of a good and well-spent life. WM. TURNER.

The Life-History of British Serpents and their Local Distribution in the British Isles. By GERALD R. LEIGHTON, M.D. Edinburgh and London: William Blackwood & Sons. 1901.

THE author speaks of his book—obviously a labour of love—as "an attempt to sketch the life-history and distribution of British serpents somewhat more fully than has yet been done in any one volume." As there are only three species of snakes in Britain, a book of over 370 pages seems ample measure for a good monograph. But the book is not that. Many pages are filled with stuff not worth printing, far less reprinting, such as anonymous letters to newspapers. The whole of Part ii., which deals, with average length and relative frequency, of snakes in different regions of England and Scotland (for there are, of course, no real snakes in Ireland), should have been condensed into a chapter with a distributional map and a few curves; the actual information in 140 pages devoted to the two questions is preposterously little.

Nor does Dr. Leighton tell us much—certainly not much that is new—about the "life-history" of our three snakes, for he has not taken the study of life and habits with adequate seriousness, and his courtesy to correspondents is excessive in the way of citation. There is a quaint lack of perspective about the chapters; thus, the third is devoted to a plague of grass-snakes at Llanelly, and the fourth to snakes in Ireland in 1900.

But there are better chapters than these, *e.g.* on hibernation and sloughing, colour variation in the adder, the effect of adder venom, the facts of reproduction, the alleged (but not accepted) habit of swallowing the young in critical situations (two chapters!), and the disease of "canker," which is left practically undiagnosed. By far the best chapter is the author's account of his study of the snakes of the Monnow Valley. To this is appended a plea (quite unjustified *by the evidence*) for the recognition of the small red viper as a distinct species—*Vipera rubra.*

The book is profusely illustrated, but many of the photographs are not representative of the objects portrayed, and those of creatures dangling half out of specimen bottles should never have been published. The simplest of drawings would have been clearer than the blurred photographs of dissections, and even the photograph of the adder's slough is extremely poor.

But while we think that the author has made too much of his material, and has said nothing about a score of interesting topics—such as, to recall almost at random, the fact that the normally oviparous grass-snake may become "ovo-viparous" (*sit venia verbo*) in captivity, or the remarkable tooth-casting in the adder, or the recent work on antidotes to adder's venom, *e.g.* its own bile—we recognise in the volume a well-intentioned contribution to the more intense study of our British fauna.

J. Arthur Thomson.

Eczema, with an Analysis of Eight Thousand Cases. By L. D. Bulkley, A.M., M.D., Physician to the New York Skin and Cancer Hospital, etc. Third Edition. New York and London: G. P. Putnam's Sons. 1901.

Just twenty years ago Bulkley published a treatise on "Eczema and its Management," which contained the most complete exposition of the subject which had then appeared. In it he defended the view of its constitutional origin, as opposed to that of Hebra and his followers, who saw in it little more than a local diseased process. At that time no hint of any direct association of certain forms with seborrhœa, forms then included under the generic term, had been given; the parasitic theory had not appeared on the horizon. With the development of Unna's ideas a fresh era began; eczema was scanned beneath a new light, and for a period his brilliant contributions dazzled the eyes of observers, while his enthusiasm carried them away. We are not yet able to fix exactly the true clinical value of Unna's descriptions and discoveries, but the criticism to which these have been subjected have at least tended to limit the supposed or implied universality of seborrhœa as the cause of eczema, while the historical inquiry and analysis made by Brocq in his work "On the Question of Eczema," preparatory to the discussion at the Paris Congress, has had the effect of focussing and steadying opinion, and once more bringing into prominence constitutional causes.

With all the intervening literature before him, Bulkley has rewritten his manual and has reproduced it in a smaller and more handy form, with his earlier opinions modified, in accordance with recent and especially with microbian notions. These have not shaken his conviction "that eczema is a manifestation of constitutional disorder, and not a purely local disease of the skin." And, again, "in regard to parasitism, the most that has been shown is that some of the micro-organisms which exist abundantly on the skin in health, do, when it has taken on disease, cease to be saprophytic and become pathologic, and so exercise more or less of a baneful influence in heightening the eruption." Proceeding on this basis, which appears in the present state of our knowledge the rational one, Bulkley carefully elaborates his conception, and so places before his readers an almost complete picture of this many-sided and very prevalent disorder. As the result of an attentive perusal, we have found all types sketched by the hand of one who—as is proved by his statistical figures—has seen a very large number of cases, and has mentally noted the characteristics, whether these were modified by age, sex, condition of life, diathesis, occupation, or locality. Diagnosis has been particularly considered, and the salient points on which discrimination has to be based will be found to be clearly and tersely put. In his description of eczema of the scalp, however, he omits one cardinal symptom, chiefly marked perhaps in the seborrhœic variety, but noticeable in any severe or long-standing instance, namely, the fixation of the skin to the subjacent parts—its absolute immobility, in fact. This is not even casually alluded to, although treatment can never be satisfactory till this hide-bound condition has been got rid of.

Great pains have been taken to formulate intelligibly the indications for treatment. Here, too, the author is conservative, though fully aware of and alive to the existence of the multiplicity of new remedies. He regards it as the better plan "to have a comparatively small list and to acquire skill in their use, than to attempt to have a large pharmacopœia with whose use one is but little acquainted." In this he follows Hutchinson, while differing from another well-known dermatologist. Still in the schedule of selected prescriptions, at the end of the volume, one encounters several wholly new elements in cutaneous therapeutics. Thus a 2 to 3 per cent. solution of permanganate of potass is recommended strongly as an antipruritic in certain stated forms. Acetanilide with gelanthum is praised as soothing and protective, while resorcin and ichthyol are regarded as among the most valuable of the more modern introductions. While in the dietetics of eczema he does not in all cases favour the indiscriminate employment of milk, he elaborates with much detail a novel mode of using it, with apparently decided success in neurotic examples.

In its amended form the work is assuredly a thorough and reliable guide, provided with which, if the directions laid down be strictly followed, most instances of a common and often rebellious disease ought to be cured.

W. ALLAN JAMIESON.

The Conservative Treatment of Tubercular Joint Disease and Cold Abscess as carried out at Breslau by Prof. J. von Mikulicz. By Dr. A. HENLE. Translated by C. W. CATHCART, F.R.C.S. Edinburgh: E. & S. Livingstone. 1900.

WHILE the methods of conservative treatment described in this work have been adopted by some surgeons in this country, they have not attained the popularity which they deserve, largely because there was no authoritative account of them at the disposal of English readers. Mr. Cathcart has filled this deficiency by translating Dr. Henle's work. It is based on the methods employed at Breslau by von Mikulicz, and it embodies the most readable and convincing case in favour of the conservative treatment of tubercular joint disease with which we are acquainted. It is thoroughly scientific in reasoning and replete with practical details. It should be stated that the methods of treatment here recommended are not peculiar to the Breslau clinique, for they have been practised for some years in many of the continental schools; Krause, for example, gives an excellent account of those employed at Halle in his recent monograph on "Tuberculosis of Bones and Joints."

The conservative treatment of tubercular joint disease and of abscess should especially appeal to the practitioner, since he is in a position to carry it out himself, whereas for the purely operative treatment of tuberculosis he is usually obliged to hand over the case to the surgeon, whether in hospital or in private practice.

It would be out of place in reviewing this work to attempt to give a résumé of its contents, for we hope that every one of our readers who has to treat the diseases in question will master its teaching for himself, and be prepared to carry it out in his practice.

We cordially agree with the author and with the translator, that with the more general adoption of conservative methods of treatment of joint tuberculosis, the number of operations performed for its cure will be still further diminished, that the functional results will be better, and that the mortality from joint tuberculosis and from cold abscess will be greatly reduced.

It goes without saying, to those who know Mr. Cathcart, that he has translated the work with the utmost fidelity to the original text. There are one or two printer's errors which have escaped correction, namely, *perineal*, instead of peroneal (page 65); *given*, instead of given up (page 66); *removal*, instead of removable plaster bandage (page 63). Mr. Cathcart has employed the German method (*Klinik*) of spelling clinique, to which there may be no objection, except that when a foreign word is adopted, it seems preferable to do so without extraneous modification.

Alexis Thomson.

Chirurgie Gastro-intestinale. By Henri Hartmann, Surgeon to the Lariboisière Hospital. Paris: Georges Steinheil. 1901.

This volume, which is appropriately dedicated to Professor Terrier, consists of a series of lectures on the surgery of the stomach and intestine, delivered by the author at the Faculty of Medicine. It represents the author's views, based on his own experience, without any attempt to cover the whole range of the subject. It is agreeably and clearly written, and its teaching value is much enhanced by the excellent illustrations. M. Hartmann is rarely original, but he has selected what is best from the teaching and observations of others, and has incorporated it into what can only be described as an eminently instructive and practical course of lectures. Throughout the book great stress is laid upon the methods of suture to be employed in closing wounds of, or in uniting the hollow viscera of, the abdomen; we scarcely think, however, that the author is entitled to claim the methods in general use as his own. The study of each operation is introduced by a short description of the normal and pathological anatomy of the viscus concerned, and is followed by a statement of the results of the operation, and of the indications for its performance. His account of the physical signs in diseases of the stomach and of the methods of examination, especially where there is supposed stasis of the gastric contents, is thoroughly practical. Of the many methods of performing gastro-enterostomy, that associated with the name of von Hacker is specially recommended. In completing the operation of pylorectomy, he follows Kocher's method if the duodenum is sufficiently long and movable, otherwise he closes the duodenum as well as the stomach, and restores the communication between the two by a posterior gastro-enterostomy. Like most other surgeons, he has abandoned Loreta's operation for innocent stenosis of the pylorus, and he is not a strong partisan of the procedure known as pyloroplasty. The various operations on the intestine are described with the greatest precision. It is worthy of comment that the majority of surgeons of the French schools are returning to the perineal route in radical operations for cancer of the rectum.

Alexis Thomson.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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AMUSIA.

As aphasia, or rather aphemia, is to speech, so is amusia to the faculties of song and the production of harmonious sounds from musical instruments. Knoblauch (*Deutsches Arch. f. klin. Med.*, Leipzig, 1888, Bd. xliii.) was the first to direct particular attention to this condition; Wallaschek (*Ztschr. f. Psychol. u. Physiol. d. Sinnes Org.*, Hamb. u. Leipzig, Bd. vi. (1) S. 8), however, and Brazier and Blocq (*Deutsche Ztschr. f. Nervenheilk.*, 1891, Bd. i.) traced the analogy further, and differentiated between several types of amusia, corresponding to the various forms of aphasia. Thus, word-deaf becomes music-deaf—auditory amusia; alexia, inability to read notation—musical alexia; agraphia, inability to sing or play, in addition to loss of the power of scoring. Brazier, also, ventured so far as to describe more recondite forms of amusia, affecting the senses of melody, harmony, rhythm, and tone severally.

Donath (*Wien. klin. Wchnschr.*, 1901, No. 40) discusses this subject. At the time of writing he had under observation a boy, æt. 4, who, two and a half years before, came under his care for myxœdematous idiocy. Up to seven months after birth his development was apparently normal; from that time his condition deteriorated; his face was full, tongue thick, mouth held open, the thyroid gland impalpable, and his voice rough. Apathetic, unresponsive when named, food had to be forced upon him. Half a thyroid tablet of British manufacture given each day caused marvellous results in three weeks. The idiot became a rational child again. Now, his parents and sisters enjoyed special musical gifts, and, while his progress was satisfactory in many ways, speech did not come to him, but music did. He proved to have a "good ear"; could sing correctly over fifty melodies—children's, national, operatic, and hymnal—but in no case with the words. If a tune were but once sung or played in his hearing, it sufficed to enable him to reproduce it without fault, even three or four months afterwards.

The facts observed in this case support Donath's conclusion, that appreciation of melody, reading of musical script, ability to sing or play, are located in different centres in posterior areas of the cerebral cortex, close to the analogous centres for speech; and—still more strongly—that the memory centres include special sections concerned in the storing up of musical data.

Motor aphasia may often be associated with motor amusia; amnesic aphasia with amnesic amusia; frequently, however, words can neither be said nor sung, although tunes can be repeated, truly "Lieder ohne Würte." Ability to pronounce words of songs, along with loss of power to produce the melodies to which they are set, a power previously possessed, forms a rarer type of amusia; and, still more infrequent, ability to pronounce words in song, but not in speech. The latter condition predicates so close a familiarity with both melody and text that this former association enables the centre for memory of melody to become *en rapport* with that for memory of words, and to materialise the same by way of collateral communications.

Music often recalls words associated with it; words fail to suggest the melody proper to them. [Surely Donath is in error here. Repetition of *the words of a song frequently recalls the tune belonging to it*; more especially if the rhythm of the words be rightly accentuated. The centres for singing and music may frequently influence their close cousins, the memory centres for words, and induce an almost impersonal action of the mechanism for speech; *vice versâ*, memorised words spoken may originate melodic associations.] Cases have been recorded of professional singers who, after the occurrence of cerebral hæmorrhage, or other organic lesion, while still able to sing in tune, and correctly as to rhythm, were unable to appreciate tone or to apportion intervals; others who could neither play nor sing, although able to recognise tune and time; and others again who could not play on musical instruments, however adept they had previously been in their use, unless some one else played the melodies before them, when they performed the same almost correctly.

Donath gives details of other cases of this condition. One is especially interesting. A gipsy violinist suddenly lost the power of speech, and, as well, of playing the violin,—except for one tune, which he invariably repeated whatever musical piece in his earlier repertoire was asked for,—and the striking of a few chords. He gradually recovered his speech and musical ability.

The facts observed in this case seem to support the hypothesis that separate parts of the centres concerned with memory may be related to the storage of particular items, and if one or other of them escapes the effects of lesions involving other units, reproduction of some memory unit in its entirety is feasible.

MEDICAL ONOMATOLOGY (TERMINOLOGY) IN REGARD TO GREEK.

ACHILLES ROSE (*Post-graduate*, N. Y., September 1901) proves his parents' prescience of the future when they chose for him the supposedly uncorrupted name of a Homeric Greek warrior, by speaking sarcastically and condemnatorily of the woful ignorance of Greek "as she is spoke" exemplified by medical terms, which clearly are erroneous, even if based upon the often faulty data in lexica (not lexicons), compiled from the writings of the famous ancients; laudatory with regard to the purity of modern Greek, and insistent on the propriety of ascertaining how contemporary Greeks would concoct or correct derivatives from Greek terms.

A few of the mistakes made by the coiners of infant and of many quite adult terms in medicine, according to Rose, are as follows:—

CURRENT.	CORRECT.
Albuminometer	Leukomatometer.
Chlorosis	Chloriasis.
Gastro- and entero-ptosis	G.- and E.-ptosia.
Glycosuria	Glycuria.
Hæmophilia	Hemorrhophilia.

(Rose writes *hemo-*, not *hæmo-*; how does he represent the long *e*, the *ἦτα*? Such a stickler for accurate derivation surely cannot approve of using one character in English to represent two different Greek forms. If *ἦτα* sounds to him as long *e* he should write it *ee*, *heemo-*; if as *ai*, then *æ*, *hæmo*, or *haimo-*.) And many more.

The author undoubtedly has a good case, but his proposed method for the purification of medical nomenclature of Greek source is somewhat chimerical, *i.e.*, all terms subject to such impeachment should be referred to the professors of the University of Athens for their approval or correction.

[Surely he forgets that many of these terms are only hybrid in a hypercritical sense, for many of the derivations from Greek roots may be equally assigned to their Latin analogues. Thus albuminometer may be regarded as thoroughbred, from *albumin* and *metrum*, the Latin form of the Greek *μετρον*; while leukomatometer, literally "a measurer of whiteness," is much more liable to misconception. Again, the common and readily permissible employment of words signifying fact in the sense of state, to which such facts conduce, is so rational that the state of ptosis of the stomach is better styled gastroptosis than gastroptosia, at least it prevents further multiplying of terms.]

ADHERENT PERICARDIUM AND TRICUSPID LESIONS.

TÜRK (*Wien. klin. Wchnschr.*, September 12, 1901), in three clinical lectures, discusses the above lesions. He begins by giving details of an interesting case. A male, æt. 52, free from hereditary taint, stranger to disease, even the diseases of childhood, save for an uncomplicated attack of typhoid more than twenty years back, until August 1900. Apart from this one illness he had had no feverish attack, no articular rheumatism, neither drank nor smoked to excess, nor suffered from syphilis. In August 1900 he commenced to be troubled with cardiac symptoms; of pressure and pain, often stabbing; breathlessness on exertion, with increased pain and distress; the pain extending along the sixth and seventh left ribs to the back; never spreading to the head or arms. After a period of improvement symptoms of graver import occurred (October 1900), and the patient was admitted into hospital.

Analysis of the more important signs and symptoms, as described from his examination, gives—

Inspection.—Orthopnœa, cyanosis, œdema of legs, slightly lessened expansion of right side of thorax, diffuse epigastric pulsation; apex-beat in fifth space, one finger's-breadth outside nipple line; visible venous pulse in neck.

Palpation.—Cold extremities; tachycardia, 180–192 per minute; pulses absolutely regular and equal, small and dicrotic.

Percussion.—Marked dulness over most of right lung, up to fifth rib in front, halfway up the scapulæ behind. Cardiac dulness from apex-beat to two finger-breadths to right of edge of sternum; base at third rib. Liver and spleen enlarged.

Auscultation.—Absence of breath sounds in right, increased over left lung. No friction. At the apex of the heart a very loud first sound, a soft, short, blowing murmur, systolic in time, preceding a pure second sound. Approaching the left edge of the sternum the systolic murmur became less and less distinct; the sounds more and more akin to a pendulum in rhythm, *i.e.*, absence of the long pause. At the base the second sound was not increased; over the tricuspid area a very soft blowing systolic murmur could be heard.

There were a few casts in the urine with a trace of albumin; some free fluid in the abdominal cavity.

Contrasting the diagnosis made and the conditions found after death—

DIAGNOSIS.	AUTOPSY.
1. Myocardial insufficiency.	1. Fatty degeneration of heart muscle.
2. Excentric hypertrophy of the right heart with relative tricuspid insufficiency (mitral lesion or adherence ?).	2. Hypertrophy of left ventricle and of right heart. Valves competent.
3. Right hydrothorax.	3. The same.
4. Partial adherence of left pleura.	4. Fibrous adhesion of lower lobe of left lung.
5. Passive congestion of liver and kidneys.	5. The same, *plus* lungs, spleen, stomach, and bowel.
6. Ascites.	6. Hæmorrhagic ascites.
7. ———	7. Total adherence of the pericardium to the epicardium following upon pericarditis.

Adherent pericardium might be said to stink in the nostrils of diagnosticians, and not without reason. In the above case no history was obtainable which could by any manner of means be taken as suggestive of previous acute pericarditic disease. The points which may best guide the clinician in his difficulty, the so-called "cardinal" symptoms, are: systolic retraction of the precordia; unchanged position of the heart-lung borders with respiration, of the apex-beat on change of posture; pulsus paradoxus; metallic clang of the cardiac sounds (Riess); constant reduplication of the second sound at the apex (Friedreich); and systolic filling of the veins of the neck accompanied by sudden diastolic collapse (*idem*).

How frequently are adhesions of the pericardium discovered post-mortem; how seldom are such symptoms, the first "cardinal" symptom especially, clinically presented! How often one or more of the succeeding obtain, due to other conditions!

Systolic retraction of the precordial thoracic wall is in truth no pathognomonic sign; the indrawing of a single rib would perhaps be conclusive, but almost a clinical impossibility. Of real importance, to Türk, remain only the superficial indraw of the lower sternal region, the foremost portion of the left hypochondrium, and the costo-cartilaginous precordia; even here these signs are rare, and may arise from an "accretio cordis" to the thoracic wall; or be caused by altered position of the heart, etc.

SURGERY.

UNDER THE CHARGE OF

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Operative Treatment of Elephantiasis of the Generative Organs.

Havelock Charles contributes an excellent article on this subject, based upon a series of 140 consecutive successful cases. The patients ranged from 16 to 62 years of age, many of them being in a very feeble state of health, with enlargement of the liver and spleen, and malarial cachexia. Several had also elephantiasis of the arms or legs, and some of both. The preparatory treatment consists in improving the general health, examining the blood for filariæ, and in local measures directed to improving the condition of the skin of the parts affected. On the day before the operation, these parts are subjected to a thorough disinfection. The patient is placed in the lithotomy position, and every attention is paid to avoid exposure to cold. The rubber tourniquet, on which the author used to rely, is now discarded, as it complicates the operation and is followed by a considerable ooze. The first incision is made in the middle line from the pubes to the orifice of the prepuce, and allows of the penis being enucleated. The tumour mass is then pulled to one side, and a second incision is made from the external abdominal ring curving towards the middle line in front of the anus, the incision varying in position according to the state of the skin. The wound is deepened, and the feeding vessels secured. The same incision is repeated on the other side, the two incisions meeting in front of the anus. The testicles are then enucleated, and, having been wrapped in gauze, are placed, out of harm's way, above the pubes. If a hydrocele is present, it is at once subjected to radical cure, by dissecting away the parietal layer of the tunica vaginalis. All blubbery material should be carefully removed wherever it is exposed. Having amputated the main tumour, and secured the vessels by torsion, the lateral skin flaps are liberated by under-cutting, and are brought together in the middle line. The testicles are placed beneath the flaps. The upper edges of the flaps are sutured to the body of the penis, any raw surface which remains being covered with Thiersch grafts. The author lays great stress on the careful application of the dressings and bandage. In cases where the spermatic cord is very long, it should be packed in folds, which are stitched to each other, and to the deeper tissues. Retention often requires relief by means of the catheter. Troublesome erections are controlled by an ice-bag applied, over the dressings, to the perineum.

In the female, the operation is a simple one. An external incision is made through the healthy skin, and a second one through the healthy mucous membrane; these cuts are deepened and prolonged until they meet above and below. The vessels are seized, and the tumour is removed. The edges of the wound are sutured, and the vagina packed with gauze. A catheter is secured in the bladder, and made to emerge through the dressings.

The article is illustrated with a number of excellent photographs, showing all the steps of the operation. The remote results are described as very favourable, the perineum being pliant and soft, the penis covered with skin instead of scar tissue, and the organ "fit for its duties in every way."—*Indian Med. Gaz.*, Calcutta, March 1901.

PHOSPHORUS NECROSIS.

L. VON STUBENRAUCH has made an extensive study of this disease. It is confined to man, and cannot be induced experimentally in animals. It is quite circumscribed to begin with; it then progresses, however, until the whole jaw dies. In the early stages the bone of the jaw becomes condensed, new bone being formed both in its interior and on the surface, but at a later stage rarefying changes occur in the old bone, while there is an abundant new formation in relation to the periosteum. The periosteal activity is not so much due to the direct action of the phosphorus fumes as to secondary infection with pus organisms, although, in those who work in match factories, there is a certain amount of increased formation of bone throughout the skeleton as a whole. The final necrosis of the jaw is also the result of superadded pyogenic infection and suppuration, the infection taking place in relation to carious teeth or to suppuration in their sockets—pyorrhœa alveolaris. The author makes no reference to the work of Ralph Stockman, who showed that tuberculous infection played an important rôle in the disease of match-workers in this country, and that the majority of those affected with disease in the jaws ultimately died of tuberculosis.—*Centralbl. f. Chir.*, Leipzig, Sept. 14, 1901.

WOUNDS OF THE VENOUS SINUSES OF THE BRAIN.

HENRY R. WHARTON contributes a long article on this subject, bringing forward many well-known facts regarding the progress, diagnosis, and prognosis of such lesions. He is of opinion that they should be classed as dangerous injuries, being followed by a high mortality, from external or intracranial hæmorrhage or septic infection. Infection is of special importance, as it is apt to result in septic thrombosis and pyæmia. The most satisfactory and generally available method of treatment consists in controlling the bleeding by aseptic gauze packing. Ligature of the venous sinus is only available in certain wounds where a free exposure of the injured sinus is possible, and cannot be employed with advantage in ordinary accidental wounds. The application of a lateral ligature is less difficult and dangerous than ligature of the sinus, but is only applicable to small wounds. The suture of sinus wounds is a valuable procedure in certain cases, namely, small wounds which can be freely exposed. Pressure with forceps may also be employed to control hæmorrhage from wounds of the sinuses, but it possesses no advantage over the other methods, and its employment is attended with certain dangers.—*Ann. Surg.*, Philadelphia, July 1901.

THE TREATMENT OF RENAL DISEASES IN ISRAEL'S CLINIQUE IN BERLIN.

ISRAEL has just published the records of the work done in his clinique during the last sixteen years, including no less than 297 individual observations. The results are published in book form, and the following is a résumé of an exhaustive review by Wagner of Leipzig:—

Among *congenital anomalies*, malposition of the kidney was met with in three cases, and horse-shoe kidney in two cases. In one of the latter there was hydronephrosis of the right half of the horse-shoe, which was diagnosed before operation.

Abnormal mobility and acquired displacement of the kidney was made the subject of operative interference in a very small proportion of the total cases, the sufferings of the patient being usually related to neurasthenia, to disturbances of the generative organs, or to a combination of these. In certain cases the kidney merely shares in the ptosis of the other abdominal viscera, and treatment other than operative is just as likely to relieve the symptoms. Israel has only performed eight simple nephropexies; in six, the nephropexy was combined with nephrolithotomy, and in five the mobility was associated with hydronephrosis.

All the *subcutaneous injuries* of the kidney healed under conservative treatment, except in one case in which secondary infection of the injured organ necessitated operative interference.

Among the cases of *pyelonephritis* there were five cases of embolic abscess, five of ascending pyelonephritis, and one case in which there was a large chronic abscess following upon ascending chronic pyelonephritis. Experience showed that these severe infective lesions may be limited to one kidney, and that they may yield to nephrotomy and drainage, or may be recovered from, after removal of the organ.

Aseptic and infected hydronephrosis.—In these conditions, the chief progress has consisted in recognising that excision of the sac, or tapping and drainage, are not the only methods of treatment available. Nephrectomy should only be performed if the ureter is obliterated, where conservative measures have failed, or where the renal parenchyma has almost entirely disappeared. The author has performed fifty-two operations; in forty cases of hydronephrosis, fifteen primary and six secondary nephrectomies, sixteen nephrotomies, two nephropexies, etc.

Pyonephrosis.—In these it is very difficult to determine how long one should persevere with conservative measures. Nephrotomy is indicated in the less severe forms in which there is some prospect of restoration of the function of the affected kidney. In nineteen cases of pyonephrosis, primary nephrectomy was performed in nine, and secondary nephrectomy in one; one was cured by nephrotomy and drainage, two were only relieved, and six died.

In renal, pararenal, and parapelvic cysts the treatment should be on conservative lines; that is to say, the cyst should be removed, and the kidney preserved.

Renal tuberculosis.—This affection, in its early and middle stages, is nearly always unilateral, and even where both kidneys are affected, the disease is always more advanced in one of them. The author has performed twenty-eight complete nephrectomies, with partial or complete removal of the ureter with eight deaths, one excision of the upper pole of the kidney, and two nephrotomies with one death. Ten cases, in which the bladder was healthy at the time of the nephrectomy, were alive and well, up to eleven years after the operation.

Syphilis and actinomycosis.—Two cases are recorded in which the kidney was removed on account of syphilitic disease, and one of actinomycosis which was diagnosed before operation and cured by nephrectomy.

Calculi in the kidney and ureter.—Operative interference is most urgently indicated in cases of calculous anuria, acute pyelonephritic infections associated with stone, and in all cases where the stone is interfering with the outflow of urine. The author has performed sixty-one operations for renal calculus, with nine deaths; twelve operations for ureteral calculus, with four deaths; and five operations for calculous anuria, with two deaths. Among fifteen primary nephrectomies, for severe calculous pyelonephritis, there were two deaths. In operating for calculous anuria, the only rational procedure is to lay open the kidney, the outlet from which was the last obstructed.

In *anuria* from other causes, diffuse nephritis, ascending pyelonephritis, and in anuria of reflex origin, nephrotomy should also be considered. Götzl's experiments have shown that increase in the pressure in one kidney brings about interference with the secretion of the other.

Essential hæmaturia and nephralgia and allied conditions are usually the result of unilateral or of bilateral nephritis, and this condition may be favourably influenced by incision of the kidney, the wound being left open for drainage.

Malignant tumours of the kidney.—Forty-three patients were subjected to nephrectomy, with a mortality of 18·6 per cent.; of these fourteen died of recurrence, and eight have remained well from three to fourteen years after the operation.

Polycystic disease of the kidney should, whenever possible, be diagnosed beforehand, as operation is contra-indicated; if the condition is only recognised when the kidney is exposed, further interference should be abandoned.

Among *diseases of the ureter* seven cases are recorded, including injury of the ureter and ureteral fistula, ureteral calculus and stricture.

Inflammation of the fatty capsule of the kidney.—The phlegmonous variety is the most important, and was the subject of operative interference in forty-five cases; incision should be practised as soon as suppuration is suspected. If the kidney is found to be also involved in suppuration, it may be enucleated from its capsule straight away; conservative operations, however, such as nephro-lithotomy, should be postponed, as an incision into the organ, when its surroundings are infected, is not unattended with danger.—*Centralbl. f. Chir.*, Leipzig, July 27, 1901.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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IMPLANTATION OF THE OVARY.

DUDLEY (*J. Am. Med. Ass.*, Chicago, August 1901), in cases where necessity exists for removing the Fallopian tubes, and where the ovaries are healthy, does not perform oöphorectomy. He does not remove those organs from their ligamentous attachments, he incises the cornuæ of the uterus, reduces the ovarian tissues to suitable dimensions, and implants them in the split cornuæ. In forty-eight cases in which this line of treatment was pursued, pregnancy subsequently occurred in twenty-eight, and of those twenty-five went to full term.

VAGINAL HYSTERECTOMY.

DÖDERLEIN (*Arch. f. Gynæk.*, Berlin, Bd. lxiii. Hefte 1 and 2) describes a modification of the above operation as performed by him. Two volsellæ applied to the cervix are made to draw the organ downwards and towards the symphysis pubis. A transverse incision is now made through the posterior vaginal wall. One blade of a scissors is now introduced into the uterine cavity, and the organ is divided longitudinally right up to the fundus; each half is now seized by forceps, and the uterus is thus rendered acutely retroverted. The anterior uterine wall and the anterior fornix are now in turn divided longitudinally. The halves of the bisected uterus can now be easily removed. Owing to the acute retroversion which the organ is made to assume, it is drawn away from the bladder, and injury to the latter is easily avoided.

WOUND INOCULATION BY CARCINOMATOUS TISSUE.

SCHÆFFER (*Ztschr. f. Geburtsh. u. Gynäk.*, Bd. xlv. Heft 1) publishes a case where a patient's ovaries were removed four and a half years previously, owing to malignant adenomata developing in them. For the past year and a half the patient had observed the development of a hard lump in the abdominal scar. The abdomen was opened, but no trace of disease could be detected either in the peritoneum or at the sites of the previous operation. Microscopically the new growth was shown to be a typical malignant adenoma. Apparently it arose by inoculation of the abdominal wound at the time of the first operation.

PREPARTURIENT BATHS IN MATERNITY HOSPITALS.

STROGANOFF (*Centralbl. f. Gynæk.*, Leipzig, 1901, No. 6) considers this important subject. He is of opinion that as usually administered they are an element of danger. The water of the bath is a dilution, more or less concentrated, not only of the organisms which are found on the skin of the patient, but also of those of the patient who previously occupied the bath. Again, danger exists of vaginal infection, owing to the entrance of water. Stroganoff has proved the possibility of this occurrence. He introduced iodide of potassium into the water in the bath, a woman was then placed in it for some time. Subsequently the external genitals were purified as thoroughly as possible, a speculum was introduced into the vagina, and from its roof mixed mucus and water was removed by means of a Simon's curette. The iodine reaction was obtained by the usual means from the fluid withdrawn. He does not believe that water can enter the vagina in all cases, but that it occurs in some, and specially in multiparæ, he considers as certain. In his own hospital he has abolished preparturient baths and substituted the application of soap lotions under a constant stream of water. In this way he believes that the patient can be more thoroughly cleansed, and without the risk of vaginal infection. Since the introduction of this method the mortality from sepsis has considerably diminished.

Sticher has also been investigating this subject, and has proved, both by chemical and bacteriological methods, that water can enter the vagina as a result of a bath, as ordinarily administered. He says: "I put into the water in the bath an organism which is not met with in the vaginal secretion—the *Bacillus prodigiosus*—and succeeded both in primiparæ and in multiparæ in proving the presence of this organism in the vaginal secretion when the patients had left the bath."

PERIMETRITIS COMPLICATING PREGNANCY.

KLEINWACHTER (*Wien. med. Presse*, 1901, No. 26) publishes the following case:—Patient, æt. 28, married eight years, last pregnancy five years. Entered the hospital June 10. She was pregnant (third month). Menstruation had ceased in the middle of March. Patient complained of metrorrhagia, which existed for eight weeks, and which came on at irregular periods, but coincident with severe pains in the sacral and left hypogastric regions. Micturition was frequent and painful, as was also defæcation. On examination, the fundus of the uterus extended for two finger-breadths above the symphysis pubis, the vaginal portion of the cervix was almost obliterated, and the os externum was slightly patulous. Bimanually the uterus was found to be enlarged, the configuration was that of a pregnant organ, but it was firm and hard as if in contraction; it was fixed, specially so at the level of the os internum. Attempts at movement produced severe pain. On the left of the uterus the tissues were resistant; this held true also on the right side, but to a lesser extent. An indurated mass, the size of a small nut, lay immediately behind the symphysis. The pouch of Douglas was hard and infiltrated. Slight pressure on those indurated parts caused severe pain. The patient was also slightly feverish. The condition was diagnosed as pregnancy complicated by parametritis and perimetritis. The patient remained in hospital for forty days. She was kept in complete rest. Viburnum prunifolium was administered to prevent uterine contractions.

Plugs of cotton-wool, impregnated with ichthyol and morphia, were employed to influence the inflammation and the pain. At the end of four or five days the fever ceased, as did also uterine contractions, the vaginal portion of the cervix began to form. The pains and frequent micturitions gradually disappeared. The indurated masses diminished, and the patient's general health improved. She left hospital at the end of forty days, and the cure completed itself by degrees. She went to full term, and was delivered of a living child. Puerperium uneventful.

This case disproves the view of Veit, who held that perimetritis and pregnancy were incompatible. Furthermore, this case is another example of how tolerant some pregnant uteri can be. Hæmorrhages, fever, premature contractions, which had obliterated the vaginal portion of the cervix, and rendered the os patulous, were unable to prevent this pregnancy going to full term.

A CONSIDERATION OF THE METHODS OF URETRO-URETERAL ANASTOMOSIS.

BOVEE (*J. Am. Med. Ass.*, Chicago, July 29, 1901) describes four methods by which this operation may be carried out—(*a*) End to end (*b*) end in end, (*c*) end in side, (*d*) side to side. The latter has not been performed in human beings. Twenty-two cases have been treated by end-to-end anastomosis and twelve by end-in-end, and in none has there been any evidence of ureteral incompetence. Poggi's method is employed for end-in-end anastomosis. The lower cut end of the ureter is forcibly dilated. Three sutures of fine silk are now employed; those pass through the entire thickness of the wall of the lower end and through the muscular and fibrous layers of the upper. In this way the upper is pulled into the lower. Interrupted catgut sutures are now used. Bovee considers that no definite rule can be laid down as to which of the above methods is the best. Loss of ureteral tissue, dilatation of the upper end, the thickness of the duct, and the direction of the cut severing the ureter, all create special conditions which must be considered in selecting the best method for any particular case. The end-to-end method makes no demand on the length of the tube. Poggi's end-in-end operation requires about $\frac{3}{8}$ in., and the side-to-side, or Van Hook procedure, takes about $1\frac{1}{2}$ in. from the length of the ureter. It must be remembered that the duct is very elastic, and can be repaired successfully even if 3 in. of its length be lost. For ordinary cases either the end-to-end or the end-in-end methods are the best, as they seem less liable to be followed by undue narrowing of the duct after operation. Furthermore, these operations take less time than the others mentioned. Except in cases where the lowest end of the duct has been injured, and where more than 3 in. has been removed, the surgeon should be able to repair nearly all cases of injury by the first two procedures.

THERAPEUTICS.

UNDER THE CHARGE OF

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THE TREATMENT OF RHEUMATIC CHOREA.

Guthrie advocates the following treatment:—In severe sthenic cases absolute rest in bed is indicated. The bed must have its sides well padded to prevent the patient injuring himself, and the bony prominences should be padded with cotton-wool. In some cases well-applied splints are useful. The best sedative is chloral hydrate, which must be pushed till sleep occurs. The dose necessarily varies, but 5 grs. thrice daily may be employed for a child æt. 5. To a child of 8 to 10 a dose of 10 to 15 grs. may be given. The bromides can be combined with chloral. They are best given by the rectum. While the patient is getting chloral the pulse must be carefully controlled, and stimulants given if necessary. In the severest cases, where chloral proves useless, inhalations of chloroform may be required. For milder cases, antipyrin in 5-gr. doses for a child of 8 may be used, or monobromide of camphor in 4-gr. doses. The author is strongly opposed to the routine employment of huge doses of arsenic. In many cases he thinks its use is unjustifiable, especially if it is pushed till constitutional symptoms occur. He thinks that arsenic given in large doses is not absorbed. In small doses, however, Guthrie considers arsenic of great value in mild cases. He finds the salicylates as useful in alleviating the pains of chorea as they are in relieving the pains of rheumatic fever, but they do not materially shorten the course of the disease. When they disagree with the digestion, salol or salicylate of bismuth may be tried.

When the acute stage of spontaneous movement has passed, treatment by means of physical exercises and suggestion may be commenced. In cases where jerking only occurs on notice being taken of the child, or on voluntary movements being attempted, suggestion can be tried. At first the suggestion should merely be that the child lies quiet during observation. If the movements are restrained, the child soon learns to lie still under observation. After that, passive movement should be combined with suggestion. At first, on passive movement the jerking commences. The hand is kept between the hands of the teacher as the various movements are being carried out, while at the same time suggestion is made that the hand should be allowed to remain quiet. At first this can only be done by keeping the limb rigid, but in a short time the child learns to keep it flaccid. These movements must be kept up till the child's limbs can be passively moved in all directions without causing jerking or rigidity. Voluntary movements are then permitted, the patient's hand being still controlled by the teacher. Then free voluntary movements may be tried. Simple movements are executed slowly and steadily. At this stage inco-ordination, rather than jerking, is the difficulty, and to overcome it Fränkel's plan of re-educating the muscles may be employed. Guthrie sketches out suitable courses, which insure freedom as well as precision in movements. All primary cases must be treated by rest in bed, to lessen the risk of endocarditis. As a general rule the child should be kept in bed till all spontaneous movements have ceased for a week. For asthenic cases treatment must be stimulating and tonic rather than sedative. Nourishing food with alcoholic stimulants are often indicated. Quinine and its salicylate may be used where muscular pains occur. Arsenic in small doses seems usually beneficial. It is useful in all cases to correct any peripheral source of irritation which may reflexly affect the nervous system, as astigmatism, bad teeth, intestinal parasites, etc.—*Med. Press and Circ.*, London, 29th May 1901.

FARADISATION OF THE HEAD IN INSOMNIA.

In this paper Sloan gives an account of all the cases treated by him during the last three and a half years. He was unable to find in any of the text-books a good description of faradisation of the head for insomnia. Most books say that faradisation is an irritant, but Sloan noticed that patients undergoing faradisation frequently complained of drowsiness. To intensify this action, Sloan applied the current to the head with very successful results, as he claims cures in 45·5 per cent. of his cases, while a further 32·5 per cent. were so much improved that the treatment must be considered a success. In 2 per cent. the treatment did harm by aggravating the distress. All drug treatment was stopped, as a rule. As far as possible, any known cause must be eliminated. During the séance talking is discountenanced, while afterwards for a few minutes the patient remains quietly resting, and all mental excitement and work should be stopped for a few hours. The first effect of the faradisation is a numbing feeling at the electrodes. Later in the séance drowsiness comes on. After the close, exhilaration, lasting for a few hours, is frequently noted. Should the treatment prove successful, the sleep at night comes sooner, lasts longer, and causes greater freshness. The author employs a special secondary coil containing an extra number of coils, as that increases the sedative effect. He finds the most suitable dose varies from ⅓ milliampère up to 1, and in exceptional cases 1½ milliampères. To control the current two rheostats are necessary, one of 50 ohms, to control the current going to the primary coil, while the other of 10,000 ohms is to control the secondary current. The primary current can be obtained from two or three large cells, or an accumulator. The electrodes are made of fine copper-wire netting thickly covered with felt. They should be warm and moist, and kept in place by an elastic bandage. The brow electrode is 15 square in. in size, and is connected with the positive pole, while the other for the nape of the neck is 10 square in. Beginning with a very faint current, it is increased till it is just perceptible to the patient. Then gradually it is raised till the maximum borne with comfort by the patient is reached. After a séance of ten to twenty minutes, the current is gradually reduced. The current is applied thrice weekly for a fortnight, or bi-weekly for three weeks. In most cases six applications are sufficient. Unless an improvement occurs with three applications, it is useless to continue the treatment. The author gives brief clinical records of forty-six cases treated by this method.—*Glasgow Med. Journ.*, August 1901.

PURGATIN A SYNTHETIC LAXATIVE.

Veit has gone into the matter of artificial purgatives at great length, and in this paper he gives a résumé of his results. The present tendency is to replace complex vegetable drugs by pure active principles. In many cases, however, the purer drugs do not act so satisfactorily, owing to their being too rapidly absorbed or too easily split up. The mild purges, such as rhamnus frangula, cascara sagrada, rhubarb, and aloes contain oxymethyl-anthrachinone, either in a free condition, or give rise, in the intestinal tract, to it by hydrolytic or oxidation processes. The action of these oxymethyl-anthrachinone products does not come up to the native drug. Thus chrysophanic acid has not the same action as rhubarb, owing, perhaps, as Schmiedeberg pointed out, to its too rapid absorption. A considerable number of oxymethyl-anthrachinone products have proved to possess a purgative action, so that Veit set himself to the task of discovering similar (easily manufactured) compounds, and then of combining them chemically, so that the best action was obtained. The oxymethyl-anthrachinone compounds contained in the vegetable purgatives are not identical, but differ in the number and position of the hydroxyl groups. As it was unlikely that the methyl group combined with the carbon had any specific action, Veit simply tested all the oxyanthrachinone compounds usually manufactured in the aniline trade. He tested the drug on cats, which were kept on a purely meat diet. Of the compounds the trioxyanthrachinones proved most satisfactory, and of these the most promising were flavopurpurin and anthrapurpurin. The hydrated oxyanthrachinones proving unsatisfactory, a series of experiments with oxyanthrachinone compounds was carried out. A number of compounds, more especially of flavopurpurin and anthrapurpurin, were formed with albumin, ether and methyl alcohol and benzyl alcohol, sulpho-compounds, and, lastly, the esters formed with acetic acid and ethyl carbonic acid. The most suitable were found to be the esters of acetic acid and carbonic acid, and of these the best proved to be anthrapurpurin diacetate, which is comparatively easily split up, but still remains sufficiently resistant to allow its action to develop gradually. To this compound the trade name of purgatin has been given. It is a yellow, finely crystalline powder, insoluble in water, slightly soluble in alcohol. The dose for men is 7½ grs. It colours the urine slightly red, but the colour of the urine is no indication of the action. Its clinical action has been studied by Ewald and Stadelmann, who find that it is a good purge, causing no tenesmus or pain. In doses of 7 to 15 grs. a soft, not watery, motion is obtained in twelve hours. It has no taste, and its clinical effect seems to range it with rhubarb, and it is especially indicated in chronic constipation.—*München. med. Wchnschr.*, 1901, No. 35.

Gelatin Injections in Aneurysm.

In a communication made to the Academy of Medicine, Lanceraux and Paulesco show that while this method of treatment has proved successful in the majority of cases, by causing solidification with cessation of expansile movement and alleviation of pain, still in a certain number of cases failures have been reported. The authors consider that this is due either to the selection of unsuitable cases, as in fusiform dilatation of the vessel, or the technique has been arbitrarily modified by giving insufficient amounts, *i.e.* 20 to 30 c.c., instead of 200–500 c.c., or the number of injections have been too few (two or three instead of fifteen, twenty, or thirty). In a former communication the authors pointed out the uselessness of gelatin in simple dilatation of the vessels, since the blood stream was not slowed sufficiently in these cases, and this slowing is indispensable to the formation of clots. At the same time they showed that the minimum dose of gelatin is about 5 grms., dissolved in 200 to 250 c.c. of saline solution. It is therefore not surprising that doses of 20 to 30 c.c. prove ineffectual. Further, when coagulation occurs, the hardening takes place all at once, with diminution of expansile movements and relieving of pain; at the end of a few days the pulsation and pain reappear. A new injection reproduces the former effect, and definite cure is not obtained till ten, twenty, or even thirty injections have been made. The authors consider that, while at first the clot occupies the whole sac, in time it contracts, and the blood again circulating through the sac is coagulated by a new injection, which in its turn hardens and contracts. In this way it is evident that several injections will be required to obliterate the sac, with hard, firm, unyielding clot. Two or three injections produce merely temporary improvement, and not permanent cure. It has also been affirmed that the gelatin method is painful and liable to cause fever, but if the solution be gently injected into the subcutaneous tissue of the thigh, it is absolutely painless, and if proper antiseptic precautions are observed there is no fever. The authors insist upon these details, as showing that the ill success attributable to this method of treatment depend entirely on a faulty technique.—*Bull. Acad. de méd.*, Paris, July 16, 1901.

A Remedy for Sea-Sickness.

The most annoying symptom in sea-sickness is the vomiting. Vomiting is due to a reflex stimulation of the centre in the fourth ventricle. This centre is anatomically and functionally very closely related to the respiratory centre. Now, one can suppress the tendency to vomit, and prevent vomiting, if one takes a series of deep inspirations. The deep, rapid breathing lowers the irritability of the vomiting centre. In all probability this is due to the ensuing apnœa, as Rosenthal has shown that every reflex action can be prevented by apnœa. Even the convulsions of strychnine poisoning can be stopped, or the reflexly induced vomiting of tartar emetic. Some experiments of the author's show that emesis due to apomorphine, *i.e.* direct central stimulation of the medulla, can be checked by inducing apnœa. Thus, $\frac{1}{6}$ gr. apomorphine given subcutaneously causes a dog to vomit within one to three minutes. If the dog be kept in apnœa by vigorous artificial respiration, it does not vomit if this amount be injected. If the apnœa is stopped, it commences to vomit. If, as soon as the dog began to show signs of retching, apnœa was induced, vomiting was prevented. Thus, even ⅕ gr. did not cause vomiting. Heinz showed that this is not due to stimulation of the nerve-ending of the nerves in the lungs, since it does not occur if vigorous inspirations are made, while apnœa is prevented by impeding the free entrance of the air into the lungs. Evidently the efficacy is entirely due to the apnœa. By deep respirations the tendency to vomit, caused by overloading of the stomach, can be checked. The author finds that the best way to prevent retching, when using the stomach tube, is to direct the patient to keep making deep inspirations. In several cases, where the author has tried it in sea-sickness, this method has proved of use.—*München. med. Wchnschr.*, Sept. 17, 1901.

TREATMENT OF MALIGNANT TUMOURS WITH ARSENIC.

UNDER certain conditions arsenic has a specific action in living cancer tissue, and by this means many cases of malignant tumours can be cured. The author employs arsenious oxide, or the potassium or sodium arsenite diluted with water or alcohol. His favourite method is a mixture, not solution, of arsenious acid 1 part, in absolute alcohol 75 parts, and water 75 parts. After carefully cleaning the ulcer from necrotic tissue, it is cleaned with hydrogen peroxide or boric acid. Then the above mixture is shaken up and applied by means of a brush or swab to the surface of the ulcer, and allowed to dry in the air. If the burning sensation be not marked, it is repeated in five minutes. Should there be much pain, it is well to blow air on the ulcer with a spraying apparatus to hasten the drying. The ulcer then remains exposed to the air for the rest of the day without any bandage. In a short time the wound begins to become moist, and there is moderate pain. Next day the surface is covered with a crust. This is not removed, but is painted daily till it eventually separates. At first, to prevent too rapid absorption, it is well to use a mixture, not a solution, of arsenic, but after the crust is cast off it is well to use a solution. This method is only applicable to cutaneous cancers, or those affecting mucous membranes, and is chiefly indicated for commencing cases of carcinoma. The arsenic acts directly on the cancer cells, killing them by coagulating the protoplasm. Where there is a stroma its cells degenerate, and there is exudation, which acts again on the cancer cells. In the surrounding healthy tissue a line of demarcation forms, which ulcerates and casts off the dead tissue, which it treats as if it were a foreign body.—Trunecek, *Wien. med. Wchnschr.*, Sept. 21, 1901.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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THE AGGLUTINATION OF THE BACILLUS COLI BY TYPHOID SERUM.

THIS is a question of great practical importance, which requires further elucidation. Sacquépée (*Presse med.*, Paris, 8th June 1901) has made certain observations upon various races of *Bacillus coli* obtained from typhoid fever cases, and tested them with the serum obtained from the same and different typhoid cases, contrasting also the agglutination result, if any, with that obtained with the Eberth's bacillus itself. Eberth's bacillus and several races of the colon bacillus were isolated from the same typhoid patient in several cases, and the agglutinating power of his blood serum was tested with each. The results with the different races of the colon bacillus were strikingly variable. Comparing them with the specific agglutination given by Eberth's bacillus, they are seen to be generally feebler, sometimes equal and rarely superior. Usually the colon bacillus failed to be agglutinated in the grave cases, and on the other hand it often succeeded in the milder cases. Without entering into his results in detail, they may be summed up as follows:—(1) Agglutination of the colon bacillus by typhoid serums is a frequent occurrence, provided that the serum and the microbes be taken from the same subject, and the test repeated several times if needs be. (2) Several races of colon bacillus may be isolated from the intestine of the same typhoid patient, showing very different reactions to the same serum. (3) The serums of typhoid patients readily agglutinate certain races of colon bacillus isolated from the intestines of other typhoid patients. (4) The extent of agglutination of the colon bacillus corresponds accurately with the severity of the typhoid infection, or with the complications. (5) This agglutination of the colon bacillus appears to indicate superadded infection or intoxication of the organism by the intestinal coli. Thus in one case, complicated by hæmorrhage, the serum on the day after the hæmorrhage strongly agglutinated the coli isolated from the intestine of that case; and in another similar case the serum was inactive on the day of the hæmorrhage, but several days later acquired a pronounced agglutinating power for the same coli.

A PLEA FOR UNIFORMITY OF TECHNIC IN WIDAL'S REACTION.

THIS reaction is most extensively used, and it has become absolutely necessary for authorities to agree upon uniformity in its technic. Owing to the present want of uniformity, practitioners are often placed in awkward dilemmas. They may send a sample of the blood of a case to a laboratory and receive a statement that Widal's reaction is given, and, being perhaps convinced clinically that it is not really a case of typhoid, they may later send another sample from the same patient to another laboratory, and this time receive an answer that the reaction is not given. This is an extreme case, but it has happened, and is likely to happen, until authorities have agreed upon uniformity. Rosenberger (*Am. Med.*, Phila., May 18, 1901) enters a useful and timely plea for its adoption, and urges the adoption of the following points in all cases:—(1) *The use of a uniform dilution.*—The following dilutions are in common use, 1 to 10, 1 to 20, 1 to 30, 1 to 40, 1 to 50, and higher. They can't all be equally true, and the experience of most authorities favours a dilution of not less than 1 to 50. An accurate method of making the dilution should also be adopted. A simple instrument for doing this accurately in the laboratory is at present a desideratum. (2) *A definite time limit.*—Within fifteen, twenty, thirty, sixty, or even one hundred and twenty minutes, are all in use as time limits, and these different periods introduce possibilities of wide variations. (3) *An agreement as to what constitutes a positive reaction.*—On this point see the Abstract of Bacteriology in the August number of this Journal. (4) *The use of a culture of definite age*, and a clear statement as to incubation, or non-incubation. Some use a 12-hour, some an 18-hour and some a 24-hour culture. Some prefer an incubated culture to one grown at room temperature. The balance of opinion favours an incubated culture under twenty-four hours old. (5) *A decision as to whether dried blood, fresh blood, or serum is to be used.*—There is no doubt at all that serum should always be used. (6) *A stated number of tests to be made in a given case.*—The author of the paper thinks that a single positive reaction should not be considered pathognomonic, since it has been demonstrated that this may be caused by a very high temperature, while, on the other hand, in a moderately afebrile stage, the reaction may not occur at all. To be scientific and trustworthy, at least two tests should be made in each case of typhoid fever, one early and one in the middle of the attack. (7) To drop the terms doubtful and pseudo-reaction. (8) Use of terms positive and negative only.

A NEW METHOD OF EXAMINING MILK FOR VARIOUS BACTERIA.

Revis and **Moore** (*Journ. Path. and Bacteriol.*, Edin. and London, June 1901) give particulars of a method they have found useful in examining milks. It consists in the addition of Eau de Javelle to the milk before centrifugalising. This substance has been used by Lannöise and Girard in treating sputa containing thick mucus, when examining for the tubercle bacillus. Its true composition is doubtful, but it is mainly potassium hydrochlorite. It is made thus: 20 grms. of good bleaching powder are triturated in a mortar with 100 c.c. of water, and 20 grms. of potassium carbonate are dissolved in another 100 c.c. The potassium carbonate must be dry, not in crystals. The two are now thoroughly mixed and allowed to stand for an hour. The liquid becomes greenish yellow, and a heavy white precipitate of calcium carbonate is formed. Filter under pressure and the filtrate is the Eau de Javelle. It is used thus: 50 c.c. of the milk are placed in a glass cylinder; 5 c.c. of methylated ether are added, and well mixed with the milk; then 20 c.c. of the Eau de Javelle are added, and the whole well stirred. The cylinder is placed in the water at 100° F. for fifteen to thirty minutes, then cooled, and 30 c.c. of a mixture of 1 part rectified spirit, and 2 parts methylated ether are added, and the whole thoroughly mixed, after which the semiclear brown liquid is centrifuged at a speed of not less than 2000 revolutions per minute. The deposit is washed into a *clean* rotating tube, six to seven drops of a 10 per cent. solution of sodium carbonate is added, and the tube filled up with distilled water, with about 10 to 15 c.c. of ether to remove the last traces of fat. Shake well and again centrifuge, and the deposit is now ready for examination. The process is simple and rapid, and all the reagents used may be kept stocked for use. The Eau de Javelle improves on keeping. A special form of rotation tube, after the pattern of Wynter Blyth's water sediment tubes, greatly facilitates the removal of deposits after rotation. By this method most of the organisms present in the milk are obtained in the deposit, and not lost in the cream.

ANTIPARASITIC SERUM IN "SURRA."

ROST (*Journ. Path. and Bacteriol.*, Edin. and London, June 1901) draws the following conclusions from some experiments made by him:—(1) That by injecting goats with surra blood, they got fever from which they speedily recovered; that a second injection of a larger dose of surra blood is more easily overcome. (2) A large amount of surra blood may ultimately be given without much affecting the animal. In the above experiments, parasites were not found in the goats in a single case. (3) The injection of sterilised serum from a goat thus prepared causes an exacerbation of the disease in mules, and renders its diagnosis more easy. (4) Horse flies can carry the parasite. (5) The serum of goats prepared as above, when mixed with surra blood, causes surra parasites to die off speedily. (6) The injection of the serum may cause sudden death of mules. (7) In ponies, although the serum appears to inhibit the appearance of parasites, it does not modify the fever, and accelerates the bad symptoms. (8) The possibility of damp grass causing surra, of rats infecting grain, of flies inoculating fresh cases, must all be taken into account.

THREE CASES OF TUBERCULOSIS OF THE HUMAN SKIN DUE TO INOCULATION WITH THE BOVINE TUBERCLE BACILLUS.

RAVENEL (*Proc. Path. Soc. Phila.*, Oct. 1900) gives particulars of human infection with tubercle from tuberculous cows. The cases were discussed by Dr. Ravenel at the Tuberculosis Congress in London, in July, and were regarded with particular interest at the time, in view of Professor Koch's pronouncement to the contrary made early in the Congress. Particulars have been published in *The Lancet*, but, in view of their great interest, they may be summed up here. Taken in conjunction with the similar cases reported by Tscherning of Copenhagen and L. Pfeiffer, in both of which the hands were inoculated in making autopsies on tuberculous cows. In four of these cases the acquired tuberculous lesion remained localised, and was successfully removed, but in the remaining one, the last mentioned, the disease became general, and caused death. His practical conclusion is that, so far as skin inoculation goes, the pathogenic power of the bovine tubercle is at least as great as that of the human tubercle.

NECROTIC BRONCHO-PNEUMONIA WITH STREPTOTHRIX.

NORRIS and Larkin (*Journ. Exper. Med.*, N. Y., Oct. 1900) describe a streptothrix which caused a necrotic form of broncho-pneumonia, and believe that it is, if not identical with, at least closely related to, *Streptothrix Israeli*, and to the species isolated by Krux. Both cases were characterised by intense catarrhal and necrotic inflammation of the bronchi, and by the presence of numerous streptothrix colonies in the bronchial lumen. Introduction of the bronchial material of Case 1 into the trachea of three rabbits induced pulmonary abscesses, and empyema of the pleura and pericardium in one of the animals. Introduction of the bronchial material of Case 2 into the ear vein of a rabbit and into the trachea of a second rabbit induced likewise pulmonary abscesses and empyema. The empyemal pus of these rabbits contained filaments and rods morphologically identical with those composing the streptothrix colonies of the human cases. From Cases 1 and 2 streptococcus was cultivated in the ordinary media, the streptothrix not being isolated in culture directly from the human organs. By inoculating the fresh and sterile kidneys removed from a normal rabbit with the empyemal pus of a rabbit injected into the ear veins with the bronchial material of Case 2, the streptothrix from this case was finally isolated in pure culture, and its morphological and biological characters studied in detail.

THE RELATION OF DIABETES MELLITUS TO LESIONS OF THE PANCREAS. HYALINE DEGENERATION OF THE ISLANDS OF LANGERHANS.

OPIE (*Journ. Exper. Med.*, N. Y., March 1901) records another case of diabetes mellitus in which the islands of Langerhans were the seat of a hyaline change. These islands are composed of polygonal cells arranged in irregular columns, between which are wide, tortuous, anastomosing capillaries. The cells are epithelial, and have the same origin as those of the ducts. The lumen of the ducts does not penetrate among the cells of the island, which is therefore not concerned in the elaboration of the pancreatic juice. These islands therefore resemble other ductless glands, such as the parathyroid bodies. In Opie's last case, he found a peculiar hyaline substance in contact with the walls of the capillaries throughout the islands, and gradually replacing the cells. When advanced, the island is represented by a sharply circumscribed hyaline structure, composed of homogeneous material, giving the impression of broken, twisted columns, between which are the capillary walls. The lumen of the capillaries remains patent. Since destruction of the islands of Langerhans in this case was accompanied by diabetes mellitus, and since this disease is absent, when, as the result of duct obstruction, the secreting portion of the gland undergoes great alteration, though the islands are spared, the conclusion is justified that it is these islands which influence carbohydrate metabolism.

THE PROTOZOON OF CANCER.

GAYLORD (*Am. Journ. Med. Sc.*, Phila., May 1901) gives the result of a large number of observations and experiments into the germ origin of cancer. He intends to publish later a second communication as a sequel to the present, embodying the results of a long series of comparative inoculations with the organisms he describes as being present in cancers, as well as a careful morphological comparison. He is to be commended for the fulness and care with which he has carried out his investigations, and for the profuse illustrations he has added to his paper, and, whatever opinions may come to be held about the truth of his results, nothing but commendation can be given him for his work. He was led to this research by observing, three years ago, a number of pale spherical bodies, varying in size from 2 to 10 μ, in the peritoneal fluid withdrawn from a case of cancer of the omentum. They were homogeneous, of pale, yellowish green colour, and at first were mistaken for fat droplets. They were found to increase in number in some of the fluid placed in an incubator, and were found still present in this fluid after several weeks. Inoculations were made upon several animals, and in one of them an adeno-carcinoma of the lung was found. The original cancer, which killed the patient, was a similar cancer of the omentum which had largely undergone colloid degeneration. His first attempts to cultivate the organism failed, but he succeeded later in cultivating it with comparative regularity directly from cancer, from fluids which were in contact with cancer, and from experimental animals. The medium giving the best results was that recommended by Celli for the cultivation of amœbæ, fucus crispus bouillon. He then examined fresh scrapings from cancers during life and post-mortem cancerous tissues, in a great number of instances, and found that the same organisms were always present in great numbers, the actual number, though subject to variation, being always much greater after death, due to the fact that the organisms either increase very rapidly during the period just before death, or that they proliferate in the tissues after death. He likewise determined that the fluid in the degenerated centre of many cancers, the so-called cancer milk of the older writers, consists practically of a pure culture of these organisms. The fluid from malignant ovarian cysts likewise contains a large number of the organisms. These organisms vary in shape, the younger being small, highly refractive, round bodies, which, in suspension, possess a characteristic oscillating motion; then later they become larger and throw out pseudopodia; and ultimately become saccular, containing highly refractive spherical bodies, the spores, the first and the last forms, being particularly abundant. By inoculating hanging-drop preparations of fresh scrapings from cancer, the smaller forms can be followed in their development into the larger ones. Owing to the fact that the specific gravity of the organisms is less than water, they rise to the surface of the fluid. As a result of many observations, he is prepared to state that all the organs, including the blood taken from all regions of all cases dying of cancer, including sarcoma and epithelioma, contain large numbers of the organisms. The question of the time of appearance of these organisms, and the utilisation of this fact as a means of diagnosis, is now under investigation by him. He reviews Sanfelice's, Russell's, Busse's, and Roncali's investigations, giving particular credit to those of the first-named observer, and also to the work of Plimmer. He came to the conclusion that Plimmer's organisms are always present in cancers, and that Russell's fuchsin bodies are merely an early stage of these organisms. On the question of the biological position of these organisms, he, however, differs from these observers, and places them among the protozoa. He is clear that the organisms found by him are the same as those found by Plimmer, and that they are parasitic and not cell degenerations or inclusions. He is clear that the yeast organism is not the essential cause of carcinoma and sarcoma, and is further of opinion that the protozoon he has described is the real cause, and thinks with Gorini that it shows the same phases of development as the protozoal organism of vaccinia. He shows that this organism can have its virulence increased by passing through animals. Fourteen guinea-pigs inoculated in the peritoneum, with peritoneal fluid containing the organism, gave an average length of life of fifty-eight days; four inoculated in the peritoneum with cancer mush gave an average length of life of fifty-seven days; eleven inoculated in the peritoneum with dried cancerous lymph nodes gave an average length of life of $45\frac{4}{11}$ days; six guinea-pigs inoculated with peritoneal fluid and lymph nodules from animals which were infected in the above manner, gave an average length of life of twenty-nine days, a little more than half the length of time for the animals inoculated directly from man; and this shows the increased virulence of the organism after passing through one animal. In the most recent experiment he grew the organism in a collodion sac in the peritoneal cavity of a rabbit, and this so increased its virulence that a healthy rabbit inoculated with this culture died of general hæmatogenous infection in fifteen days. The microscopical pathological findings in these cases were generally uniform, namely, emaciation, reddened peritoneum, enlarged lymph glands, and a moderate amount of clear straw-coloured fluid. One dog presented a large lymphoma of the spleen, and another typical metastases of sarcoma in all of the regional lymph nodes. The peritoneal fluid, the blood, and the organs all showed large numbers of the parasites.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF

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Observations on the Air Currents in Nasal Respiration.

For a considerable period of time it has been generally accepted that the inspired air passes backwards through the nasal chambers, mainly in contact with the surface of the inferior turbinated bodies. These structures, owing to the erectile nature of their tissues, subserve the function of warming and moistening the air in its passage through the nose. When the individual is exposed to a cold or to a dry atmosphere, the inferior turbinated bodies swell, and in this way they present a larger heating and moistening surface. For this reason they are regarded as playing an important part in the physiology of nasal inspiration.

Some interesting and valuable observations have recently been made by Charles A. Parker (*Journ. Laryngol.*, London, July 1901), which tend to show that the above route may not be altogether the true one. This observer had been struck by the fact that patients with an absolutely free inferior meatus and post-nasal space would often complain of stuffiness and inability to breathe through the nose; further, that hypertrophy of the middle turbinals, or polypi (in no way obstructing the inferior meatus), caused difficulty in nasal respiration. These clinical facts suggested that nasal inspiration took place, at any rate to a large extent, through the middle meatus.

In order to determine the passage taken by the air in inspiration, Parker carried out the following experiments, which may be briefly detailed:—In order to detect the inspiratory current, lycopodium powder was employed in the case of the individuals on whom the observations were made; this powder was used on account of its being so light. The air was charged with it by means of an insufflator, held about 6 in. from the nostrils. The route of the expiratory current was observed by getting the individuals to gently exhale cigarette smoke through the nose, its course being watched by means of a nasal speculum. As a result of numerous observations upon normal nasal chambers, it was found that during quiet inspiration the powder was carried on to the septum nasi, striking it about ½ in. from the nostrils, and about ⅓ in. from the floor of the nose. It then spread upwards and backwards over the septum in the region of the middle meatus, impinging on the middle turbinated body, especially at its anterior end. The outer wall of the middle meatus also received some of the powder, which extended as far as the eye could reach into the superior meatus. The inferior meatus and inferior turbinated body entirely escaped contact with the powder; occasionally a little was seen upon the upper surface of the latter, due possibly to gravity. On posterior rhinoscopy, the lycopodium was seen quite at the top of the posterior choanæ, and possibly also on the upper fourth of the septum. Occasionally, too, it was evident on the roof of the naso-pharynx. After deep and forcible inspiration, the distribution of the powder was very similar; but, in addition, there was some on the upper part of the inner surface of the inferior turbinated, and also on its upper surface. The inferior meatus, however, always remained free. Expiration apparently took place mainly through the inferior meatus, or that portion of the nasal chamber below the upper margin of the inferior turbinated body. In forcible expiration, there was also some exit through the middle meatus. In the naso-pharynx and larynx, the distribution of the powder in these experiments also suggests certain points of interest. A considerable quantity is deposited upon the roof of the naso-pharynx. If the inspiration was more forcible, it was also seen to occupy the centre of the posterior wall of that chamber; thence it passed to the larynx, impinging upon the arytenoid cartilages, missing, as a rule, the epiglottis. It would appear, therefore, as if the air followed the distribution of the adenoid tissue, while in the larynx the arytenoids, and not the vocal cords, were directly exposed to the irritation of the incoming air.

These observations have an important clinical bearing when we come to study the question of nasal obstruction, and the factors which give rise to it. Thus quiet inspiration may be impeded by—(1) Spurs and deviations of the septum, and enlargements of the inferior turbinated body, if they project forwards and upwards. Parker lays down, for practical purposes, an imaginary line drawn from the anterior extremity of the inferior meatus, just within the vestibule, to the anterior end of the middle turbinate; any enlargement crossing or breaking such a line will cause obstruction. (2) Enlargements of the middle turbinated body, polypi, etc. (3) Hypertrophies and growths springing from the vault of the naso-pharynx. Expiration will be more especially affected by—(1) Hypertrophies of the posterior end of the inferior turbinate; (2) hypertrophies, etc., causing stenosis of the inferior meatus.

SOME RECENT REMEDIES AND APPLICATIONS IN LARYNGO-RHINOLOGICAL PRACTICE.

SIEGMUND MORITZ discusses the value of certain remedies introduced during recent years for local application to the throat and nose (*Med. Chron.*, Manchester, July 1901). Amongst these, he again refers to the use of cocaine, a drug which now plays so important a part in nasal and laryngeal practice. Special attention is drawn to the increase in salivation which is sometimes produced by its use in the mouth and pharynx. This he ascribes to the bitter taste of the drug, and recommends the addition of saccharine to the solution as a preventive. This he has found very successful in combating the hypersecretion of saliva. In commenting upon the use of eucaine beta, the author remarks upon the hyperæmia which this substance induces. While this dilatation of the blood vessels is undoubtedly a disadvantage, on account of the increased hæmorrhage which may be induced in cutting operations, it may facilitate a snaring operation upon the mucous membrane of the inferior turbinated body, as anæsthesia of its surface is produced without any diminution in the size of mass. Cocaine, on the other hand, produces contraction, so that the mucosa may become collapsed, and the snare fail to obtain any grip of the object. Eucaine possesses a further advantage, in that it may be boiled without decomposition, and therefore can be preserved for a longer period.

The author speaks very favourably of the use of antipyrine in painful affections of the throat. A solution of 25 to 50 per cent., either alone or with the addition of cocaine, produces an anæsthesia, or, at least, an analgesia, which lasts for several hours. It has been found particularly useful in laryngeal phthisis with painful deglutition, exerting not only an anæsthetic action, but apparently producing a distinct healing effect upon the tuberculous ulceration. The value of orthoform for similar purposes has been so frequently alluded to, that we need not follow here the writer's remarks upon this drug.

Brief reference is also made to the therapeutic value of oxycamphor and heroin, which have been recommended on account of their influence in diminishing dyspnœa and the tendency to cough. An alcoholic solution containing 25 per cent. of oxycamphor, and named oxaphor, has been found of value in the relief of dyspnœa, whether of pulmonary, laryngeal, or cardiac origin. Neumeyer recommends forty drops of oxaphor as an initial dose, but this requires to be increased. Heroin acts in doses of $\frac{1}{12}$ gr., given twice or thrice daily, but not more frequently.

Moritz next deals with the application of phenyl-sulpho-ricinic acid, introduced by Heryng in the treatment of laryngeal papillomata. This is an oily fluid, which may be applied upon cotton-wool and rubbed into the growths. In a case reported by the writer, recurrent papillomata, which had required repeated removal with the forceps, finally disappeared under the combined use of forceps and acid, and showed no sign of recurrence three years later. Trichloracetic acid has also been found very useful in syphilitic ulcerations of the mouth and pharynx. This may be applied as a strong solution (20, 50, or 80 per cent.), or by means of the crystals fused upon a probe. The probe, however, must only be very slightly heated. Ulcers become clean, and heal rapidly under its application, the superficial eschar separating in twenty-four to thirty-six hours. Brief reference is made to the use of suprarenal extract in temporarily constricting blood vessels, reducing hyperæmia, and thus diminishing hæmorrhage in nasal operations.

The Production of Local Anæsthesia in the Ear.

It is now generally admitted that the mixture of anilin oil, absolute alcohol, and cocaine, introduced by Gray of Glasgow (*Lancet*, London, April 21, 1900), has proved to be a very valuable means of producing local anæsthesia of the tympanic membrane and middle ear. It is not necessary now to detail the steps taken by Gray in arriving at a satisfactory solution to effect this purpose. The mixture is employed by him in the following proportions:—5 or 10 parts of cocaine hydrochlorate, 50 parts of dilute alcohol, and 50 parts of anilin oil. Ten or twelve drops of this solution are instilled into the ear, and kept in contact with the drum membrane, by placing the patient's head in the horizontal position. The value of this procedure has recently been attested to by Dupuy of New Orleans (*Laryngoscope*, St. Louis, July 1901). Thirty cases were observed. In the first three, complete anæsthesia of the inflamed tympanic membrane was obtained by the use of a solution containing 10 parts of cocaine, free incision being possible without causing any pain. In the two following cases, however, such a result was not obtained, so that it became necessary to increase the amount of cocaine to 15 parts, a solution which he continued to use with success in a number of cases. In one case, however, it was found necessary to instil a solution containing 20 parts of cocaine before complete anæsthesia was produced; this solution was used in other cases. In none of these instances were there any toxic effects. Not only was it found possible to incise an inflamed membrane without causing pain, but, owing to the penetrating power of the mixture, the middle ear itself was rendered anæsthetic. Proof of this was furnished in two cases of chronic non-suppurative otitis media, in which the ossicles were painlessly removed. This solution may also be used preliminary to the removal of polypi and granulations, thus diminishing or preventing the pain which accompanies such operations. Dupuy has found that the action of the drug is facilitated, by first instilling peroxide of hydrogen, so as to soften and dislodge the loose epithelium upon the inflamed membrane. He also advises that the meatus should be completely filled with the solution, and that it should be allowed to remain in contact with the tympanic membrane about ten or fifteen minutes.

A Note on the Morbid Conditions Simulating Adenoids.

Wingrave draws attention to the number of children who exhibit the signs of nasal obstruction which are usually associated with adenoids, and in whom no adenoids are found (*Journ. Laryngol.*, London, September 1901). In other cases, again, after the removal of these growths, there is a persistence of such signs, which may in no sense be due to any failure in carrying out the necessary post-operative treatment as regards respiratory exercises. He cites a number of causes for this failure in relieving the patient by operation. These may be briefly referred to here—(1) Diminutive nostrils and posterior nares; the latter may be due to the thickening of the mucous membrane. (2) Low pharyngeal vault; this condition he has noted in ill-nourished and rickety children. (3) Paresis of the soft palate and pharyngeal muscles; this may result from nasal obstruction. (4) Prominent crest of the vomer. (5) Forward projection of the vertebral column; the naso-pharynx may not admit the tip of the finger. (6) Enlarged retro-pharyngeal lymphatic gland. (7) Undue prominence of the soft parts covering the hamular process of the internal pterygoid plate and the tuberosity of the palate; this is associated with thickening of the mucous membrane covering it. (8) Webs and neoplasms in the naso-pharynx.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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Feeding of Infants with Sterilised Milk.

P. **Desfosses** (*Presse med.*, Paris, 1901, No. 53) gives an account of the working of a system introduced by M. Dufour about seven years ago, under the name of *l'œuvre de la goutte de lait*, the aim of which is to check the great infantile mortality among bottle-fed children by supplying sterilised milk at a rate within the means of all classes. The depôts for preparing and dispensing the milk are called colloquially "Gouttes de lait," and are very unpretentious, as is seen by his account of one established a year ago at Versailles. It consists of two rooms, one for sterilising and the other for dispensing the milk, and the fittings of these are of the simplest order. Besides the sterilisers, there are racks for the feeding-bottles, and provision for thoroughly washing and scalding them, also a weighing machine to determine periodically the weight of the babies.

The paid staff consists of a manager who dispenses the milk and takes note of the weight of the babies, and a girl who sterilises the milk and washes the feeding-bottles and teats. For the youngest babies, one-third part of water is added to the milk, and also 30 grms. sugar and 1 grm. salt to each litre.

Each mother daily receives as many of these filled feeding-bottles as the infant can use in twenty-four hours—as a rule, nine are supplied. Next morning when she returns the empty bottles she gets another supply of full ones. Nobody is supplied gratis, but the customers are divided into three classes—the poor, the lower middle-class, and the rich; the first paying 20 centimes, the second 50 centimes, and the third 1 franc for a day's supply for an infant, however much that may be. The mother is asked to bring the infant, if possible, once a week to get it weighed, and if the increase of weight is not continuous the case is reported to the visiting physician. When once the scheme is started, it can be made to pay its own way. The author gives the following statistics of infantile mortality from the town in which the scheme was first introduced:—

	Among Entire Infantile Population.	Among Infants at Goutte de Lait.
Enteritis . . .	96·7 per 1000	12·8 per 1000
All other causes . .	131·3 ,,	57·6 ,,

The Influence of Hospital Isolation in Scarlet Fever.

For some years past the opinion has been growing that the good effects expected from the increased amount of hospital isolation in cases of scarlet fever have not been realised. The late Sir Richard Thorne Thorne, in his evidence before the Vaccination Commission, stated that "whenever we have been able in a given large town to inquire how far any diminution of the amount of scarlet fever has been due to isolation, we cannot make out that the diminution has in any sensible way been due to that practice."

In an elaborate investigation into this question, as regards English towns, by Dr. Millard (*Pub. Health*, London, No. 7, vol. xiii.), we have an array of statistics which seems at least to support this opinion. The data for his statistics were furnished by the medical officers of health of the individual towns, in response to a circular which he sent out.

The decrease in the mortality due to scarlet fever is shared in alike by towns with and without hospital isolation, and in many towns this reduction began before hospital isolation was seriously attempted or even thought of. This reduced mortality is almost entirely due to a change in the case mortality of the disease, though a small share of it may be due to a change in the age constitution of the population, owing to a diminishing birth rate.

Statistics as to prevalence of the disease can only be known from the notifications, and therefore are only attainable for the period since the adoption of the Notification of Infectious Diseases Act. His treatment of the statistics of Huddersfield may be taken as an example. In this town both hospital isolation and all other preventive measures are energetically carried out, and its death and infantile mortality rates in 1899 were lower than those of any of the thirty-three great towns.

Huddersfield.

Period.	Average Number of Births annually.	Average Number of Cases of Scarlet Fever annually.	Percentage of these Isolated.
1871–79	2655·6	...	...
1880–89	2465·9	256·8	67·7 per cent.
1890–99	2228·3	427·0	90·4 ,,

Thus in a population with a decreasing proportion of children there is an increased prevalence of scarlet fever coexistent with a greatly increased amount of hospital isolation. He compares the prevalence and case mortality of scarlet fever in Huddersfield during 1890–99 with that in towns having practically no hospital isolation for the same period.

	Case Mortality.	Attack Rate.	Percentage Isolated.
Huddersfield . .	4·5 per cent.	4·3 per 1000	90
West Ham, Preston, Swansea, and Burnley	3·3 ,,	4·4 ,,	Practically none.

Thus in a town with 90 per cent. isolation, the scarlet fever prevalence is practically the same as that in towns in which there is no hospital isolation, and the case mortality is greater. He also shows that in a group of nine large towns, in which there is only on an average 28·8 per cent. of scarlet fever cases isolated in hospital, the case mortality in 1890–99 was only 3·8 per cent. It is often stated that the fatality of cases treated in hospitals is much less than among those treated at home. He considers that the two classes of cases cannot fairly be compared, because the actual number of deaths from this disease is so small that a very few deaths transferred from one group to the other makes a great difference in the result. Some cases being too ill to remove to hospital, die before they can be removed. His conclusions are, that the hospital isolation of scarlet fever appears to have failed to materially reduce the prevalence and case mortality of this disease, and that, indeed, the latter has fallen most in towns which have not practised isolation. He thinks the whole question should be further investigated.

THE UTILITY OF ISOLATION HOSPITALS.

DR. NEWSHOLME contributes a paper on this subject (*Journ. Hyg.*, vol. i. No. 1) with special reference to scarlet fever. Since this is an infectious disease, personal contact between healthy and sick should be prevented, and in the majority of cases this can only be done in isolation hospitals. Isolation and disinfection are at present the only known practicable means for preventing, or at least minimising, its spread. The want of success of these measures is due to defective diagnosis, delay in isolating, insufficiency of numbers isolated, and careless disinfection. His experience is that hospital-treated cases have a lower case mortality than those treated at home, though the former include a larger proportion of severe cases than the latter.

THE PRODUCTION OF PLAGUE IN RATS BY INHALATION.

THE readiness with which plague bacilli lose their virulence, and the importance of having always available virulent bacilli for the production of protective vaccine or curative serum, are well known. The production of primary plague pneumonia by inoculating the nasal mucous membrane with plague cultures is, according to Dr. Erich Martini (*Ztschr. f. Hyg.*, Leipzig, Bd. xxxviii. Heft 2), not always successful, and, besides this, the danger to the experimenter is great, owing to the struggles of the animal during the operation. To obviate this, he has devised an apparatus, by means of which a suspension of plague bacilli in salt solution is sprayed into a carefully closed glass chamber, in which a rat, contained in a small wire cage, has been previously placed. The whole apparatus and working are fully described. The experiments were done in the plague laboratory attached to the New Institute for Infectious Diseases in Berlin. Of thirty-six rats experimented with, thirty-two died of primary pneumonia, and in the most of these death occurred in three to four days. The virulence of the bacilli from the pneumonic juice of these animals was such that when injected subcutaneously death occurred in from two to three days, and when intraperitoneally in six to twenty-four hours. He found that in the great majority of his experiments, whether subcutaneously or intraperitoneally, that the bacilli from a case of plague pneumonia produced in the animals no buboes, but either plague pneumonia or plague septicæmia. These results are in consonance with those of Schotelius. He considers that for the production of either plague vaccine or plague serum, and for the standardising of these, this method of obtaining virulent bacilli is to be recommended.

PHTHISIS AND ITS SPREAD.

Ztschr. f. Hyg., Leipzig, Bd. xxxviii. Heft 1, is entirely taken up with communications by Flugge and the workers in his laboratory on this subject ("Weitere Beiträge zur Verbreitungsweise und Bekämpfung der Phthise"). Those on the spread of this disease by the sputum are particularly interesting. Flugge considers that the conditions of some of Cornet's experiments were not at all similar to those generally found in dwellings. While the experiments prove that animals exposed to clouds of dust arising from the vigorous brushing or beating of carpets, etc., on whose surface much tuberculous sputum had dried, they did not prove that such dust was a frequent cause of phthisis. It is to the fine particles of dust which remain suspended in the air for some time that attention should be directed. By sweeping and beating such fabrics in a closed glass chamber, Flugge and his co-workers found that the air of the chamber *during* the beating of the carpets always contained the tubercle bacillus, but if the air were allowed to settle for ten minutes this was as a rule not the case. The bacillus-carrying material which remained longest suspended in the atmosphere were the fibres of handkerchiefs, when these were experimented with, and all their positive results, after ten minutes, were due to this cause.

In his experiments on rooms, etc., Cornet used a piece of wet sponge to collect the samples of dust, and therefore bacilli brought there by contact, as well as those deposited from the air, would be removed. Flugge's experiments were devised for the purpose of comparing the results got from places quite inaccessible to infection unless by floating dust, with those got from places where direct contact was possible; and also of differentiating between infected material adhering to surfaces, and which only could be removed by a wet sponge, and that which had fallen as dust, and therefore could be removed by a dry camel-hair pencil.

The experiments were conducted both in the houses of phthisical patients and in hospitals. The houses examined were, as a rule, of the poorest order, and far from clean. In sixty experiments in houses the bacillus was found five times, in all cases near the bed or on the floor skirting. In sixty experiments in hospitals the bacillus was also found on five occasions, in three of these in high situations away from any chance of direct contact. In 120 experiments the dust was removed by Cornet's method, that is, by a wet sponge; the bacillus was found thirty-four times, but only six of the places were certainly inaccessible to infection by direct contact.

As a result of these experiments, he considers that the atmosphere of rooms occupied by phthisical patients contains the tubercle bacillus relatively seldom, and that danger of aerial infection is only present when, from any circumstance, clouds of dust are raised. One experiment illustrates this point. In a ward entirely occupied by phthisical patients, he examined the dust on the ward table both before and half an hour after the "making" of the beds. In the latter case the tubercle bacillus was found, but not in the former.

There is greater danger from the fine droplets which are ejected into the air when coughing. Experiments show that infection by this means may take place at a greater distance than a yard. The tubercle-bearing droplets, however, soon subside. Of eleven experiments it was found that in two cases only they were present in the air after thirty minutes. Holding the handkerchief in front of the mouth during the paroxysm of coughing diminished the risk greatly. Phthisical persons when coughing should hold a handkerchief before the mouth, and keep at a distance of at least a yard from other persons.

REPORTS OF THE MEDICAL SOCIETIES.

Glasgow Medico-Chirurgical Society.—*October* 4, 1901.—The President, Dr. W. G. Dun, gave an address "On Blood-letting in the Treatment of Disease," tracing it from the time of Galen down to the middle of the nineteenth century, when it began to fall into disfavour. He then went on to discuss the principle on which venesection is practised, stating that what might be termed the mechanical theory seemed to answer the question. In one of his own cases, in which he bled a patient suffering from acute bronchitis, distressing dyspnœa was the most urgent symptom; the withdrawal of a small quantity of blood gave the utmost relief. He also quoted a case, reported by Dr. John Wylie of Stewarton in 1883, where the life of a young man suffering from capillary bronchitis seemed to have been saved by blood-letting. Venesection was recommended in uræmic coma; and in this condition Dr. Dun had employed it with a good result. There the idea was that with the blood a certain amount of poison was thrown out, while at the same time an osmotic flow took place from the tissues to the blood, preventing an accumulation of toxines in them. Dr. Dun made a brief reference to local blood-letting by means of cupping or leeching. He had found cupping of great service in cases of cardiac distress, as angina pectoris, and in cases of advanced Bright's disease with cardiac complications. The practice of poulticing after leeching was not to be recommended, as the bleeding was sometimes excessive. In conclusion, Dr. Dun remarked that blood-letting was no cure for inflammation, but that in cases of the kind which he had pointed out, particularly where the right side of the heart was overburdened, and in danger of failing, it ought not to be forgotten.

OBITUARY.

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James Pollard, C.A.

On September 26, the City of Edinburgh, and especially its Public Health Department, suffered a severe loss in the death of James Pollard, ex-Bailie, and Convener of the Public Health Committee. Never a really strong man, he did not thoroughly recover from an attack of pneumonia from which he suffered in the month of June, and after a holiday in the Highlands, during which his condition gave great anxiety to his friends, he returned to Edinburgh, only to die of cerebral congestion a few days later.

Born in Ireland, Mr. Pollard came to Edinburgh at a very early age, and later became a Chartered Accountant. In spite of the cares of an ever-increasing business, he was able to devote a large amount of time to the interests of the city, and from the time of his election to the Town Council he took particular interest in the work of its Public Health Committee. When Sir James Russell retired from the post of Convener to that Committee, in 1891, Mr. Pollard took over his work; and it may be said, without exaggeration, that no city has ever had a Public Health Convener who was more energetic or better educated in sanitary matters. The question of a new Isolation Hospital was being considered about the time of his appointment, and it is due to his great personal interest in the subject, and his unwearied efforts, that the magnificent new buildings, at present in course of construction at Colinton Mains, were commenced. With the city architect, Mr. Morham, he travelled over the Continent, seeing what was newest and best in hospital construction, and making a wise selection of what could be most profitably imitated in this country. Latterly he turned his attention to the question of the spread of consumption, and, using Sir Henry Littlejohn's able and complete report on "Pulmonary Phthisis in Edinburgh" as his text, he started a campaign, with a view to secure the notification of phthisis and the isolation of far advanced cases in the City Hospital. His own account of consumption, presented as a report to the Town Council, was a most admirable piece of work, and well calculated to impress the general public with the importance of the question. Unfortunately his untimely death will probably delay the immediate realisation of his schemes, but there is no doubt that he started a movement which is likely to have great results.

As Convener of the Hospital Committee, Mr. Pollard visited the patients in Infirmary Street at least once a week. He knew the names and occupations of all the adult patients; and when the bread-winner of a family was lying in hospital, his anxiety for his wife and children was lessened by the fact that the Convener and Mrs. Pollard were visiting his home and assisting to maintain his family. With the medical and nursing staff of the Hospital Mr. Pollard was on most cordial and friendly terms, and his death is nowhere more lamented than in the Hospital which he loved so well. Of the medical men of Edinburgh the late Convener was always ready to take advice in the furtherance of his schemes, and he will be universally regretted by the members of our profession.

An essentially kindly man, Mr. Pollard had an inexhaustible fund of sympathy for those in suffering or distress. An hospital patient himself, as a lad, in Mr. Spence's wards in the Surgical House of the Old Infirmary, he seemed to acquire there a love for doctors, a love for suffering humanity, a love even for the actual buildings in which he was nursed, now the Fever Hospital. Never out of temper, and provided with a strong sense of humour, he was popular with his colleagues in the Council, all of whom concur in extolling his single-mindedness and his extraordinary capacity for work. It is to be feared that he fell a victim to his own great energy, and that, had he spared himself more, he might have still been with us to-day. He leaves behind him a widow and three daughters, to whom we beg to offer our deepest sympathy.

JAMES FOULIS, M.D., F.R.C.P. Edin.

THE profession in Edinburgh has suffered a serious loss by the premature death of Dr. FOULIS, at the age of 55. Amongst his friends it was known that he laboured under a cardiac affection, and since an attack of influenza in spring he has not been at all well; his fatal illness, nevertheless, was unexpected, and has come as a widespread grief.

James Foulis was the son of Dr. John Foulis of Sydney, and a grandson of the seventh baronet of Woodhall. He was educated in Australia, but came to Scotland to prosecute the study of medicine. He began his medical career in the University of Glasgow, but when Lister came to Edinburgh, he, like many others, also migrated hither. After a distinguished career in the University, he graduated as M.B. in 1872. Having devoted himself to embryological researches, and especially to the structure and functions of the ovary, he submitted a thesis which obtained one of the gold medals. He settled in our midst and became assistant first to Dr. Thomas Keith, and later to his brother, Dr. George Keith, whom he succeeded on his retirement from practice. Dr. Foulis in this way stepped very early into a foremost place as a medical practitioner, and there are few indeed who have been able to win such implicit confidence or such deep affection from their patients as he enjoyed. In the midst of all the toils and cares inseparable from a large and important practice, he was able to devote considerable attention to scientific research, and from time to time he contributed valuable papers to the societies and the journals; his favourite subject to the end being embryology. He will long be remembered for his enthusiasm in all matters belonging to sanitation, and his name will be held in honour for much useful work in that field.

Dr. Foulis has left a widow, a son, and two daughters, with whom in their bereavement there is wide and deep sympathy.

EDWARD HARRIMAN DICKINSON, M.D., F.R.C.P.

WE regret to hear of the death, in his fifty-ninth year, of Dr. EDWARD H. DICKINSON of Liverpool. He was educated at Cheltenham, Oxford, and Edinburgh. He graduated as M.D. at the University of Edinburgh in 1876, obtaining a gold medal for his thesis. He was elected a Fellow of the Royal College of Physicians of London in 1880. Formerly Lecturer on Comparative Anatomy and Zoology at University College, Liverpool, he was Honorary Physician to the Northern Hospital for upwards of thirty years—an appointment which he resigned in the spring of this year owing to failing health. He was the author of several important papers, but his cultured tastes and keen relish for sport naturally led him to spend much time in the pursuit of art and literature, as well as in out-of-door sports, to the necessary curtailment of scientific investigation. Dr. Dickinson has left an honoured name, as an upright and generous physician. He was twice married, and leaves a widow and three children to mourn the loss they have sustained.

ANALYTICAL REPORTS.

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TABLOIDS: "CODEINE AND NUX VOMICA," "IRON CITRATE COMPOUND," "β-NAPHTHOL COMPOUND," "ERGOTIN AND STRYCHNINE," "GALBANUM COMPOUND," "ERGOTIN," "APOMORPHINE."

(Burroughs, Wellcome, & Co., London.)

THE formulæ for these recently introduced tabloids are severally as follows:—

1. CODEINE AND NUX VOMICA.—Codeinæ Phosphatis, 1 gr.; Extracti Nucis Vomicæ, ¼ gr.—*Sign.* One to two for a dose, etc.

2. IRON CITRATE COMPOUND.—Ferri et Ammonii Citratis, 3 grs.; Quininæ Sulphatis, 1 gr.; Acidi Arseniosi, $\frac{1}{60}$ gr.—*Sign.* One to three for a dose, etc.

3. β-NAPHTHOL COMPOUND.—β-Naphthol, 1 gr.; Carbonis Ligni, 4 grs.; Olei Menthæ Piperitæ, ½ minim.—*Sign.* One to four for a dose, etc.

4. ERGOTINE AND STRYCHNINE.—Extracti Ergotæ, 3 grs.; Strychninæ Sulphatis, $\frac{1}{30}$ gr.—*Sign.* One as directed.

5. GALBANUM COMPOUND.—Pilulæ Galbani Compositæ, 4 grs.—*Sign.* One to two, as ordered.

6. ERGOTIN.—Extracti Ergotinæ, 1 gr.—*Sign.* One to four +.

7. APOMORPHINE.—Apomorphinæ Hydrochloridi, $\frac{1}{10}$ gr.; Strychninæ Hydrochloridi, $\frac{1}{60}$ gr.—*Sign.* For hypodermic use.

One is really at a loss for anything fresh to say about Messrs. Burroughs & Wellcome's pharmaceutical novelties. The advantages afforded by the constantly increasing tabloid series, *pace* the loss incurred by dispensing chemists, are so well known, and have been so universally experienced, that there can be few unaware of them. Indeed, nowadays a patient might answer his physician in the manner of Macbeth—"'Throw physic to the dogs; I'll none of it'—save but in tabloids 'fancy bred.'"

All the seven tabloids catalogued above have useful formulæ; all are compressed, Nos. 2, 4, and 6 sugar-coated, No. 7 for hypodermic use. The flattened discs of tabloids, with their convex surfaces, are more readily swallowed than globular forms of the same content; but, in addition, the materials in each tabloid have been so compressed that what often seemed a fearsome object to swallow, as encountered officially, appears free, as a tabloid, from awkward possibilities.

The tabloids of Codeina and Nux Vomica have been especially prepared with a view for use in the treatment of glycosuria; the β-naphthol compound for cases of gastric dilatation with fermentation, although, may be, of equal or more value for intestinal fermentations; combination of strychnine with apomorphine, for hypodermic use, renders the latter less likely to cause embarrassing prostration; the indications for the employment of the remainder are apparent from their superscriptions.

Testing the actual solubilities, *inter nos*, of these tabloids, the forms not coated with sugar were found to dissolve rapidly in the mouth, or, as in No. 3, to disintegrate readily. The three coated with sugar proved to be quickly broken down and soluble, on removal of their external covering.

MERCUROL, SUPRARENAL LIQUID, AND NARGOL.

(Parke, Davis, & Co., London and Detroit.)

WE have had occasion, before now, to allude to the composition and merits of mercurol, a combination of mercury and nucleinic acid. Further experience proves it a very useful drug. Nargol, a similar preparation, with silver in place of mercury, is a salt readily soluble in warm water, and an excellent means by which to apply the recognised antiseptic and detergent properties of silver salts, minus the irritative effects produced by them in inorganic guise. The liquid suprarenal preparation also contains chloretine, successfully proved to be a local anæsthetic. It is for local application by means of a spray, or on a pledget of cotton wool; the suprarenal moiety acting in virtue of its surprising properties as a hæmostatic; the chloretine as an antiseptic and local anæsthetic. The combination promises well.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Means for the East of Scotland District, for the Five Weeks ending September 28, 1901; and for the Year from January 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean .	52°·5	[1] 380° [2] 2072°	8° 620°	3·5	22·6	137	1121	2°·5
Observed	54°·1	[1] 423° [2] 2231°	0° 657°	2·6	19·8	148	1271	2°·2
Difference	+1°·6	[1] + 43° [2] +159°	− 8° +37°	−0·9	−2·8	+11	+150	−0°·3

Vital Statistics.

Mortality in Four Large Towns in the East of Scotland (Edinburgh, Dundee, Aberdeen, and Leith), during September, and since January 1, 1901. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1] 1009 [2] 10297	170·3 192·9	202 2080	34·1 39·4	91 974	15·3 18·2	123 1877	20·9 35·1	120 1189	20·2 21·1
Actual Deaths and Rate per 10,000	[1] 988 [2] 10327	167 193·4	218 2172	36·8 40·9	101 1030	17·0 19·2	130 1635	22·2 30·6	107 1165	18·0 20·7
Difference from Mean	[1] − 21 [2] + 30	−3·3 +0·5	+16 +92	+2·7 +1·5	+10 +56	+1·7 +1·0	+ 7 −242	+1·3 −4·5	−13 −24	−2·2 −0·4

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1] 100 [2] 712	16·9 13·2	28 271	4·7 5·0	51 752	8.55 14·2	86 1032	14·5 19·3	55 468	9·3 8·64
Actual Deaths and Rate per 10,000	[1] 96 [2] 777	16·2 14·4	27 295	4·5 5·4	69 781	11·6 14·7	93 934	15·7 17·5	59 565	9·9 10·5
Difference from Mean	[1] − 4 [2] +65	−0·7 +1·2	− 1 +24	−0·2 +0·4	+18 +29	+3·05 +0.5	+ 7 −98	+1·2 −1·8	+ 4 +97	+0·6 +1·7

* **Note.**—The figures [1] denotes the data for September, [2] for year to date.

Thus, the five weeks ending on 28th September were much warmer, brighter, and drier than usual, the excess of warmth over 42° F. being 11·3 per cent., of hours of sunshine, 8 per cent. above the normal; the deficit recorded in precipitation of rain, 25·7 per cent. below the average.

The values for the year to date mainly agree with those for September; degrees of warmth, +7·6 per cent.; hours of bright sunshine, +13·3 per cent.; rainfall, −12·3 per cent.

The general death-rate for September in these four towns was less than the average, although, with the exception of nervous, digestive, and urinary diseases, the majority of the classes discussed show values above the mean; especially was this so in pneumonia (equal to +35·3 per cent.). Influenza was registered as the cause of two deaths.

For the first nine months of the year the mortality values exhibit a number of marked divergences from the usual. The total death-rate scarcely varies from its mean; but increases over the normal characterise the figures under constitutional, circulatory, digestive (9·1 per cent.), urinary, pneumonic, and malignant (20·7 per cent.) diseases; decreases under respiratory (12 per cent.), nervous, and phthisical (9·5 per cent.) causes are presented.

The most notable points are to be found in the great decrease in respiratory deaths, although deaths from pneumonia are more numerous; the distinct decrease in fatalities from phthisis; and the increase, proportionately greater, under cancerous diseases.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

A CONTRIBUTION TO THE STUDY OF FEVER IN LYMPHADENOMA, WITH SPECIAL REFERENCE TO SEVENTEEN REPORTED CASES OF TERMINAL RECURRENT FEVER IN LYMPHADENOMA AND SARCOMATOUS DISEASE.

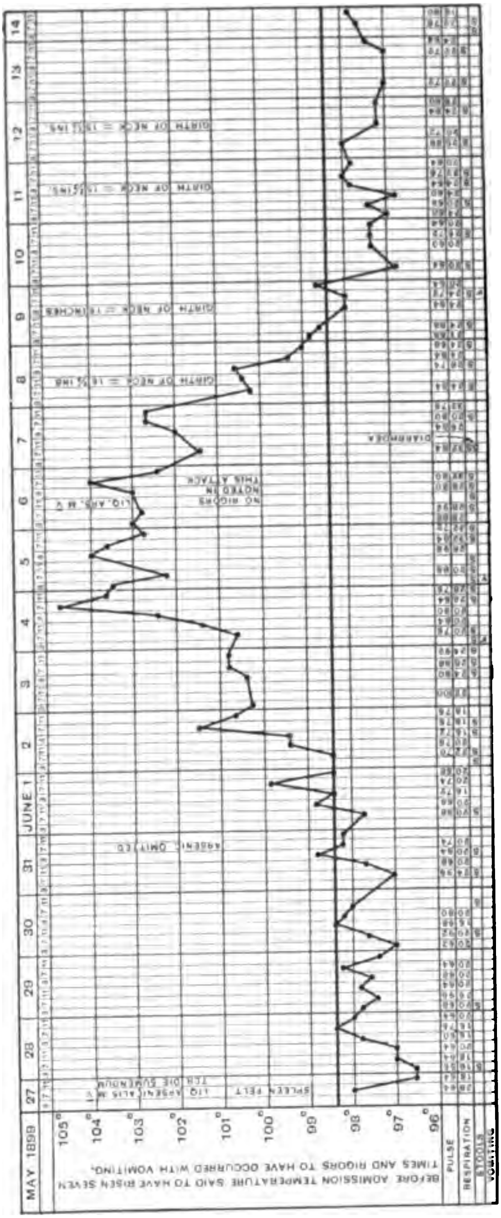
By H. Batty Shaw, M.D., *Assistant Physician to University College Hospital, London.*

(Plate VIII.)

The pathology of lymphadenoma is so little understood that the description of any phenomena occurring in the course of the disease, offering somewhat anomalous features, is welcome, from the possible light it may throw upon the etiology of this malady. I am indebted to the courtesy of Dr. Sydney Ringer and Mr. R. J. Godlee for permission to publish the details of a case of lymphadenoma with recurrent fever occurring in University College Hospital, and to Professor Osler for references to the earlier reported cases.

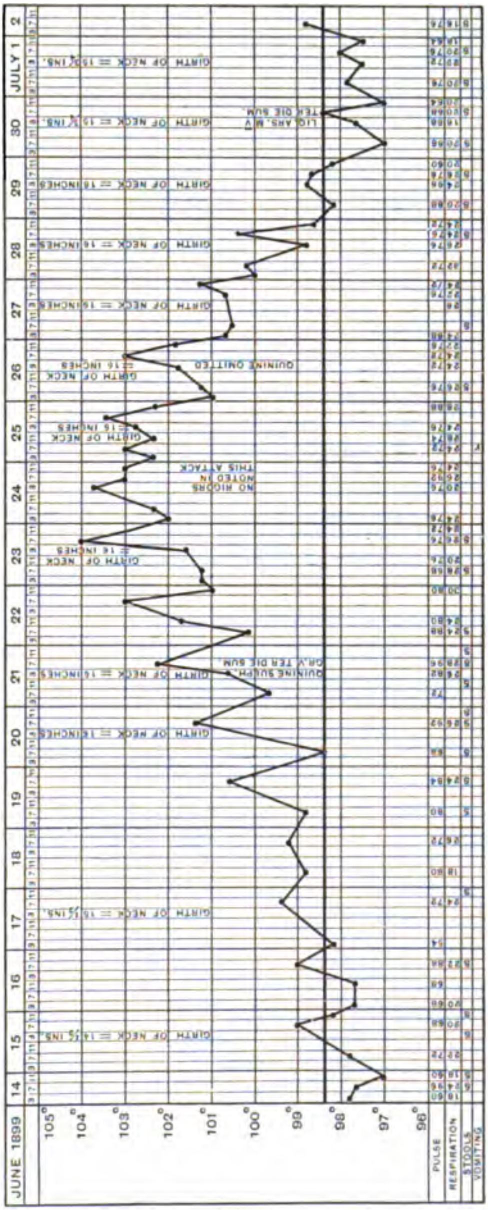
Case 1.—G. C., a commissionaire, was admitted to the hospital with a mass of enlarged glands on the left side of the neck, lying underneath and on either side of the sterno-mastoid muscle, and reaching from the ear to the clavicle (Plate VIII.).

In the above case all the characters of lymphadenomatous glandular invasion were present. The glands were freely movable, being in the earlier stages free from attachment to one another or to the skin; as a rule they were not tender, but one or two near the clavicle showed some tenderness, were softer than the others, and the skin in the neighbourhood was distinctly red. The blood examination revealed nothing abnormal, beyond the fact that there was an increase in the total leucocytes (16,000 per c.mm.); the relative proportion of the various leucocytes was normal. Shortly after admission the temperature rose, reaching a height of 102°, the girth of the neck increased, and the tenderness of the glandular swellings was intensified. The case was then transferred to Mr. Godlee's care, and a number of glands were removed; no suppuration was found in any of the glands, though yellow-white areas were seen, showing a tendency to caseation. The wound healed quite normally, and the patient was discharged much relieved. A little more than two months later, the patient was again admitted under Dr. Ringer's care, with the history that since his last visit to the hospital he had had seven attacks of fever, in which he shivered, vomited, and had occasionally some diarrhœa. In the intervals between the attacks the glands in the neck shrank so that he could easily button the collar of his commissionaire's tunic; during the attacks this was quite impossible. The spleen was now found to be enlarged, and there was swelling of the left arm. On June 1 the temperature gradually rose, reaching 104°·6 on the 4th of the same month, and then gradually subsided, reaching normal on the ninth day from the onset of fever. A similar attack occurred between June 19 and 29 (*vide* charts). On both occasions there was a measurable increase in the girth of the neck; in the latter attack, the upper part of the glandular mass had become much softer and smaller, the lower part larger and very much more tender, the skin over it becoming quite purplish in colour, and appreciably warmer to the hand than the surrounding part. There was no marked alteration in the blood at this time. Towards the latter part of July another slight rise took place.



having much the same accompaniments as in the former attacks. The patient then left the hospital, returning again in October very much wasted, with increased glandular enlargement on the right and left sides of the neck in both axillæ and groins, and signs were present of involvement of the mediastinal and retroperitoneal glands. Blood examination showed about 80 per cent. of the normal red blood corpuscles and 55 per cent. of hæmoglobin; there was also an increase in the leucocytes. The temperature was raised, but reached the normal in about nine days. A fourth and much more protracted period of pyrexia commenced on November 2 and lasted to the 22nd of the month, death following shortly after.

At the autopsy the enlarged glands in some places were adherent to one another; the spleen was greatly enlarged, and showed the "hard-bake" deposits met with in lymphadenoma. In no case was suppuration met with in any of the glandular masses, whether found in the neck, axillæ, mediastinum, or retroperitoneal tissues; the glands on section revealed the characters met with in lymphadenoma. A few lymphadenomatous masses, as large as peas, were found in the liver. Tubercle bacilli could not be demonstrated in the deposits found in the spleen.



The special points of interest in the above case were the periodic rises of temperature, accompanied by severe constitutional disturbances, such as anorexia, vomiting, diarrhœa, and on some occasions rigors; in addition, local changes were obvious in the glandular masses; they enlarged during the pyrexia, shrinking again with the fall of temperature; and there were also present a marked intensification of redness, pain, and heat of the skin near some of the masses. No suppuration was found at the operation or at the autopsy. No evidence of the malarial parasite had been found in the blood during the periodic fever. The earliest recorded case at all similar to the above is reported by Hodgkin (^{1}) in his paper on, "Some Morbid Appearances of the Absorbent Glands and Spleen." In Case 7, mention is made of a young woman, æt. 25, who was supposed to have malaria; two attacks of fever were observed, intermittent in character. At the autopsy a deposit was found in the spleen and another in the kidney; the description suggests that the case was one of lymphadenoma. Wunderlich (^{2}) later described a case in which, with a rise of temperature, there was an associated increase in size of the enlarged glands and spleen, with a shrinkage when the temperature fell; this, however, was only noted once. Murchison (^{3}) in 1870 described a case of lymphadenoma in a girl æt. 6, with periodic rises of temperature. Three years later, Sir William Gowers (^{4}) called attention to three types of temperature met with in lymphadenoma, and he mentioned a case under Wilson Fox's care, in which there was intermittent fever with a marked increase in the size of the glands during the pyrexial period. Gowers found fever was present to a greater or less degree in about two-thirds of all cases of lymphadenoma; in thirteen out of forty cases the temperature was terminal, in twenty-seven it appeared to be a characteristic of the disease even in earlier stages. In 1885, Pel (^{5}) gave the first detailed account of this clinical type of disease; he also mistook such a case for typhoid fever with four relapses, and also noted the enlargement of the spleen with a rise of temperature and contraction during the apyrexia; indeed, he makes this a means of diagnosis from typhoid fever, in which disease, as a rule, the spleen remains large during the interval of apyrexia. Osler (^{7}), writing in the same year, refers to Case 1 of his series of private patients; this was a case of lymphadenoma, showing ague-like paroxysms, with rigors and hot and sweating stages; the temperature rose to 104°, and the glandular enlargements became more marked; he does not refer to the occurrence of redness of the skin with tenderness in the neighbourhood of the enlarged glands. In 1887, Ebstein (^{8} and ^{9}) described similar cases under the name, "Das chronische Rückfallsfieber, eine neue Infections-krankheit." Ebstein's first patient had attacks of fever about once a month. Ebstein noticed that the rise of temperature was, as a rule, gradual, but that the fall was more sudden; the average duration of the fever was thirteen to fourteen days, the periods of apyrexia, ten to eleven days; on one occasion only was any complication found which could account for the rise of temperature. Ebstein also noted that the appetite of his own patient and of the one described by Murchison was enormous during the periods of normal temperature, and was much disturbed during the paroxysms of fever. Ebstein also noted periodic enlargement of the spleen. As opposed to Pel, who would rather look upon such cases as merely "special infectious forms of so-called pseudo-leukæmia," Ebstein preferred to call them cases of "chronic recurrent fever," referring them to some unknown bacterial origin. Ebstein did not agree with Pel in thinking that the excessive appetite in the periods exempt from fever was a cause of the subsequent rise of temperature. Neither Pel nor Ebstein were able to find any definite etiological factor. Renvers ([10]) followed with a description of another case, under the name of "Lymphosarcomatosis, with Recurrent Fever," and objected to Pel's nomenclature, because the actual infection was unknown. The first efforts to detect an organism in such cases were made in the year 1888. Maffucci ([11]) found streptococci and bacilli in the enlarged glands of patients dying of this disease, and a micrococcus and short bacillus were found by Majocchi and Pecchini ([12]) in all parts of the body affected. Cardarelli ([13]) also found a typhoid-like organism, and he described a form of pseudo-leukæmia occurring in young children, in whom there were present attacks of fever at irregular intervals throughout long periods; there were also progressive cachexia and a hard splenic tumour; the spleen was extirpated in one case, the child notably improving, losing the attacks of recurrent fever. In 1889, Kast ([14]), in discussing the relationship of body temperature in general to malignant tumours, referred also to a case of a boy æt. 7, with involvement of the glands of the neck and of the inguinal and axillary glands. There were nine attacks of fever in five months; the case presented somewhat the features of typhoid fever, and later developed a yellow skin with urobilinuria. At the autopsy general invasion of the glands, liver, spleen, and kidneys was discovered, and the case was probably one of lymphadenoma, though Kast preferred to look upon it as a case of multiple sarcoma with recurrent fever. Kast concludes that intermittent, remittent, and recurrent types of fever may occur in cases of sarcoma and carcinoma, involving the stomach, etc. He thinks that the periodic rise of temperature is due to a periodic absorption of some toxic body. Similar cases were described in 1889 and 1890 by Hanser ([15]), Völckers ([16]), and Klein ([17]). Hanser raised the question, whether it really was not a fault in these cases that there was a mixed infection. Völckers noted the occurrence of syphilis in his own and Renvers' case.[1] Klein was unable to find any organisms in the liver of his case, but streptococci were found abundantly in the cortex of the glands affected, less so in the medulla. Puritz (18) also described a case of sarcoma of the liver, in which there were periods of fever with afebrile intervals. The temperature charts do not, however, show such regular periods of pyrexia and apyrexia as in the cases described by Pel and Ebstein. Puritz thought that there was a great possibility that the accessions of fever were due to invasion by an infective agent. Stevens (19) has also described a case of Hodgkin's disease with a fluctuating febrile course; in three attacks there was noticeable enlargement of lymphatic glands; and in another there was intense pain over the spleen, coincident with the rise of temperature.

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[1] *Loc. cit.*

Fischer (20) published a paper in 1893 on the subject of "Malignant Lymphoma with Secondary Infection and Recurrent Fever." He does not favour the view that such cases form a special variety of lymphadenoma, but that such secondary infection may occur in other diseases, *e.g.* carcinoma and sarcoma. He admits the difficulty of trying to account for the periodic temperatures, and invokes a periodic temporary immunity. Fischer was able to make cultivations from the blood and lymphatic glands during the febrile attacks and in the intervals; he found *Staphylococcus pyogenes aureus* during the febrile manifestation, but failed to find any in the feverless periods; nor at the autopsy were any organisms recoverable from the glands by culture or inoculation. In opposition to Langhans, Fischer does not believe in the subvarieties of lymphadenoma—one characterised by hard enlarged glands, the other by soft ones, for in his case both kinds were met with; a similar condition was found in Dr. Ringer's case. Fischer makes no reference to the redness and tenderness, like that present in the skin in Dr. Ringer's patient. Westphal (21) also contributes a very exhaustive paper on the fever met with in lymphadenoma. He gives details of twenty-one cases, and these comprised cases in which the fever was continuous or remittent, or intermitting. The twelfth case described had recurrent attacks of fever, and at the autopsy no complication was found, so that this case may well be considered as an example of simple lymphadenoma with recurrent fever. A very remarkable case was described by Hammer (22) of "Primary Sarcomatous Osteitis with Chronic Recurrent Fever." According to Hammer, the variations in temperature are not a sign of infection, but merely a characteristic of sarcoma or cancer; other possible explanations are that the fever in such cases is merely a specific reaction of the individual attacks, or that each rise of temperature coincides with a fresh metastasis; and, finally, that the periods of temperature are due to the localisation of the tumours to certain blood-forming organs. Hohenemser (23) prefers to call such cases examples of multiple sarcomata, and remarks upon the occurrence of diarrhœa and urobilinuria in such cases; he, however, only considers such manifestations as accidental. From the clinical point of view the diagnosis has to be made from typhoid fever and tuberculosis. Hohenemser quotes Strümpell on the rarity of relapses in typhoid fever beyond two or three occasions, whereas in this malady several relapses are known; and, further, in multiple sarcoma with recurrent fever the patient is quite well in the intervals between the periods of fever. In tuberculosis periodic temperature is rare. Hohenemser concludes with a résumé of the characters of this form of malady:—(1) Recurrent fever is a well-marked symptom; (2) the disease is clinically and anatomically separable from lymphadenoma (?); (3) blood alterations are not very marked; (4) the spleen and liver are enlarged, and there is general glandular swelling; (5) Urobilinuria and peptonuria are met with; (6) etiology is unknown, but tuberculosis can be excluded.

In 1895, Delbet (24) announced the discovery of a bacillus in a case of lymphadenoma, which produced generalised lymphadenoma in a dog, inoculated with material derived from a lymphadenomatous gland. The evidence, however, is slender, and only one dog was inoculated successfully. In further reference to the question of bacterial invasion, to explain the periodic rises of temperature, Stengel (25) quotes Verdelli, who stated that twenty-nine of such cases examined for organisms showed positive results. Stengel, however, thinks that such invasion is purely terminal. As already stated, several writers prefer to call cases of lymphadenoma, with a specially malignant and rapid course, cases of sarcoma; but, as Stengel remarks, it is often quite impossible to distinguish between what is known as cases of lymphadenoma and lymphosarcoma. Billroth's dictum, that in the former there is a tendency to spread to adjacent glands, and in the latter to adjacent tissues, is not of practical value, for the characters are common to both types. The confusion existing in the nomenclature of such diseases is well shown in Göppert's résumé (26), where he says that lymphosarcoma must include—(1) ordinary splenic lymphadenoma; (2) ordinary splenic lymphadenoma of children; (3) the aleukæmic stages of leukæmia.

Fischer (27) in 1897 again returned to a discussion of the subject, and still maintains the view of considering such cases as "malignant lymphoma," an independent disease with an unknown etiology. Before a definite diagnosis can be given, tuberculosis must be excluded, and he also admits that tuberculosis of other organs can exist synchronously with malignant lymphoma. James Finlayson (28) has recently published details of a case which in its clinical course was very similar to Dr. Ringer's case, with the exception that there was no periodic enlargement of the lymphatic glands synchronous with the rise of temperature. The remarkable feature of Finlayson's case was the almost complete disappearance of the lymphadenomatous glands during the course of the disease.

An analysis has been made of sixteen cases collected from the literature, in which "recurrent fever" was a special feature occurring in the course of certain diseases; it is, however, admitted that all the cases described are not simple lymphadenoma, in fact there is considerable doubt about the cases described by Völckers, Puritz, and Hammer. The remaining thirteen cases, together with the case described in this article, may be considered cases of lymphadenoma. The question, practically as unsettled to-day as it was when Pel and Ebstein first described their cases, is whether we should consider cases of lymphadenoma with recurrent fever as a special form of lymphadenoma or as a special disease. Considering the number of cases of lymphadenoma which pursue an afebrile course for months and even years, or do not show attacks of recurrent fever, it must be acknowledged that, in the form of lymphadenoma with recurrent fever, some other agency must be at work; so much has been done of late years in the investigation of "terminal infections" in chronic disease, that it is almost impossible to think otherwise of the recurrent fever met with in lymphadenoma, than that it too is due to a similar bacterial invasion.

It is difficult to say during what period of time before death an invasion by organisms may be considered terminal. In the series of more or less undoubted cases of lymphadenoma, already referred to, the intervals elapsing between the onset of fever and death were as follows:—Murchison's case, two and a half months; Pel's first, second, and third cases, respectively five months, five months, and fourteen months; Ebstein's case, eleven months; Renvers', eleven months; Kast's, five and a half months; Hanser's, twelve months; Fischer's, fourteen months; Hohenemser's, three months; Westphal's, twelve months; Finlayson's, roughly about five months; Dr. Ringer's case, eight months. These periods amount on an average to a little over seven and a half months. Seeing that cases of lymphadenoma may last for years, and that when once "periodic fever" has commenced it persists till death, it may be allowed that such terminal infections may take place as long as twelve or even fourteen months before death.

As to the bearing of these cases upon the pathology of lymphadenoma, it must be admitted that the results are quite negative, and rather tend to show that uncomplicated lymphadenoma is not due to an infection of any of the ordinary organisms like staphylococci or streptococci, since in only a very limited number of cases have such organisms been found, and even in these the effect has been very different in producing recurrent fever in a few cases, and in others fever without any marked periodicity. Lymphadenoma, as Sir William Gowers has pointed out,[1] may be accompanied by moderate continued fever throughout the illness; out of forty cases, twenty-seven were found to possess such elevation of

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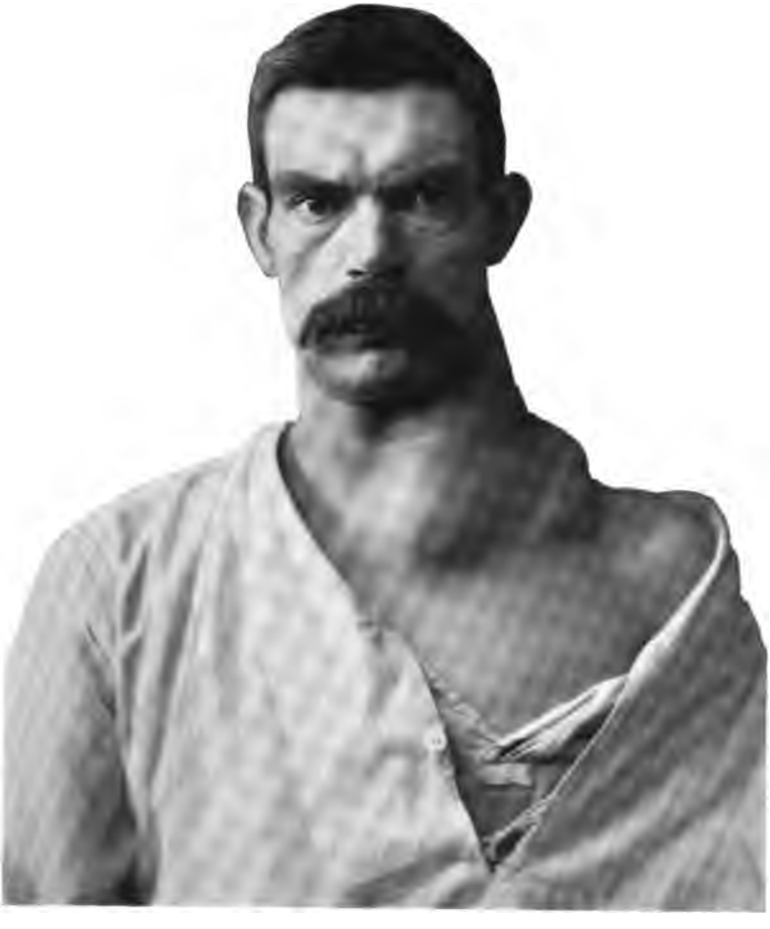
[1] *Loc. cit.*



temperature, the remaining thirteen being free from fever except towards the end of the illness.

That the specific agent causing lymphadenoma, whatever its action may be, is not responsible for the periodic fever, is shown in the analysis of the cases reported by Völckers, Puritz, and Hammer; periodic fever has been described in cases of malignant disease of the liver and stomach; and similar features are met with in the malarial form (so called) of malignant endocarditis, in pernicious anæmia, leucocythæmia, and other blood diseases.

It is almost beside the mark to refer to the fact that in all cases of periodic fever occurring in lymphadenoma, there has not been a positive bacteriological observation; the positive cases are so numerous now that one may almost conclude that the negative ones are merely the result of some fault in technique.

In Dr. Ringer's patient, and in eight of the other cases analysed, periodic attacks of fever occurred, accompanied by enlargement of the spleen or lymphatic glands. This feature has always been a puzzling one, and so far no adequate explanation has been given; enlargement of the spleen in other infectious diseases is well known. A point of further interest is that in Dr. Ringer's case, not only did the glands enlarge, but they became painful and the skin over them became reddened with the rise of temperature; neither at the operation nor at the autopsy on Dr. Ringer's case was suppuration demonstrable. It is possible that the glands become invaded by the organisms found so frequently in the skin, and are able to deal with them without the occurrence of suppuration; the fact that thirteen of the seventeen cases analysed showed well-marked enlargement of the superficial glands, lends some support to this view.

In further résumé of the above cases, urobilinuria was found in five cases, and a doubtful form of jaundice in two others. Twelve of the undoubted cases of lymphadenoma occurred in males and two in females, as in uncomplicated lymphadenoma the male sex preponderates. The number of febrile attacks varies from one or two to as many as thirty-three, noted in Hammer's case; the attacks of fever varied from two or three days to as many as thirty-two days. The average duration of life from the onset of the illness was a little over twelve months.

Consideration of the above cases impresses the view that "lymphadenoma with recurrent fever" is not a special form of disease, that such cases are due to a terminal infection occurring any time during the last year of life of some patients affected with lymphadenoma; that the nature of the bacterial invasion is different in different cases, and that in some cases proof of a bacterial invasion is wanting; that in a considerable number of cases of lymphadenoma with recurrent fever, there is a great constitutional disturbance with elevation of temperature, rigors, vomiting, and diarrhœa, anorexia, and malaise; that in some cases

[*Continued on page* 512.

Analysis of Seventeen Cases of Terminal Recurrent Fever.

No. of Case.	Author and Title of Case.	Occupation, Age, and Sex.	Enlargement of various Organs during Life.				Periodic Enlargement of Organs, etc., Synchronous with Rise of Temperature.	Duration of Illness, from Onset to Death.
			Superficial Glands.	Spleen.	Liver.	Deeper Glands.		
1	MURCHISON (7). "Lymphadenoma."	Girl, æt. 6.	Cervical axillary: groin also tender.	Yes, spleen tender.	Yes.	Mediastinal glands enlarged, producing dulness behind sternum, which increased with rise of temperature.	Cervical glands increased, with periodic attacks of fever.	2½ years.
2	PEL (5). "Pseudo-leukæmia" (infectious form).	Male, æt. 25, paper-hanger.	No.	Yes.	"	..	Spleen enlarged, with rise of temperature.	4–5 months.
3	PEL (6). "Pseudo-leukæmia" (infectious form).	Male, æt. 32, naval officer.	Yes.	"	"	(?)	Same phenomena noticed as in Case 2, probably (p. 646, *l. c.*).	1 year.
4	PEL (6). "Pseudo-leukæmia" (infectious form).	Sailor, æt. 41.	Yes, supraclavicular and inguinal.	"	"	..	Spleen showed periodic enlargement with rise of temperature.	13–14 months.
5	EBSTEIN (8). "Chronic recurrent fever."	Male, æt. 19, mechanic.	No.	"	No.	Yes.	Spleen regularly enlarged with rises of temperature.	About fifteen months.
6	RENVERS (10). "Lympho-sarcoma with recurrent fever."	Male, æt. 31, conjuror.	"	"	"	Some felt in left iliac fossa.	Spleen enlarged with rise of temperature.	About fourteen months.
7	KAST (14). "Chronic recurrent fever and multiple sarcoma."	Boy, æt. 7.	Yes.	"	"	..	Spleen becomes distinctly larger during febrile attacks, and shrank subsequently.	Acute illness, lasts 5½ months.

8	Hanser (15). "Chronic recurrent fever" (Ebstein).	Male, æt. 25.	,,	Yes, splenic dulness increased, but spleen not palpable.	Yes.	..	No mention.	About one year.
9	Völckers (16). "Sarcoma with recurrent fever."	Male, æt. 30.	Only a few noticed near a tumour growing from lumbar vertebræ.	No mention.	No mention.	No mention.	No mention.	10 months.
10	Klein (17). "Pseudo-leukæmia with cirrhosis of the liver and recurrent fever."	Widow, æt. 51.	Yes, especially inguinal and crural.	Yes.	Yes.	..	Superficial glands enlarged, still more during febrile attack.	Jaundice for 5 years, but acute illness only 13 weeks.
11	Puritz (18). "Sarcoma with so-called recurrent fever."	Woodman, æt. 29.	Yes, axillary left cervical.	Yes (probably).	,,	Not enlarged.	..	About one year.
12	Fischer (12). "Malignant lymphoma with recurrent fever and secondary infection."	Male, æt. 34.	Yes, glands quite free from tenderness.	No.	No.	Mediastinal glands were enlarged, and caused dyspnœa.	No alteration noticed in size of glands.	18 months.
13	Westphal (21). (Case 12 of series). "Pseudo-leukæmia."	Barber, æt. 25.	Yes.	Yes.	Yes.	..	..	1 year.
14	Hammer (22). "Primary sarcomatous osteitis with chronic recurrent fever."	Miller, æt. 41.	Yes, three months before death.	Yes.	,,	..	No mention; deposits of growth found in vertebræ.	Acutely at 10 months.
15	Hohenemser (25). "Recurrent fever with multiple sarcomata."	Clerk, æt. 28.	Yes, painless.	Yes.	,,	Yes, bronchial.	..	Acute illness, 3½ months.
16	James Finlayson (28). "Hodgkin's disease."	Coachman, æt. 49.	Yes, cervical, axillary, inguinal.	No.	No.	,,	No.	1 year 5 months.
17	Case described in this contribution, "Lymphadenoma with periodic fever."	Soldier, æt. 41.	Yes, cervical, axillary supracondylar, inguinal.	Yes.	Yes.	Mediastinal.	Temporary enlargement of glands well marked in periods of elevated temperature.	About eight months.

urobilinuria is a marked symptom; that in some of the cases the superficial lymphatic glands, and even the spleen, become very tender and enlarged during the attacks; and that the skin over the enlarged glands may become reddened and show increase of local temperature. Finally, that the prognosis in such cases is, as a rule, hopeless, and that the duration of life, after the onset of the periodic attacks of fever, averages about seven and a half months, but may be as much as twelve or fourteen months.

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THE TOXÆMIC BASIS OF GENERAL PARALYSIS.

By John Macpherson, F.R.C.P.Ed., *Commissioner in Lunacy for Scotland.*

Among the numerous theories of the causation of general paralysis which prevailed prior to the commencement of the past decade, the most widely accepted was the theory of "premature involution." According to this theory, the disease was regarded simply as a premature senile decay of the cortical elements of the cerebrum. The various other concomitant changes occurring in the nervous system were looked upon as sequential trophic degenerations, for it was argued that the cells in the cortex controlled the function and the nutrition of most of the nervous elements in the body. Such a theory, it is needless to state, was, from a scientific point of view, wholly inadequate as an explanation of the etiology of the disease, and as an aid to progressive knowledge was completely inoperative. It is true that the pathological aspect of the brain of a person who dies from this disease bears a superficial resemblance, both macroscopic and microscopic, to the appearance met with in senile insanity, but there the analogy ceases. Were it, however, possible to explain the changes which occur in the cortical cells as the result of a species of premature senility, many other questions of supreme difficulty would remain unsolved. Among these unsolved problems may be mentioned the profound alterations that are constantly found in the arterioles and capillaries of the cortex, and which, as Bevan Lewis and Mendel pointed out ten years ago, occur simultaneously with, if not prior to, the implication of the nerve cells. Nearly twenty years ago, Tuczek called attention to the early destruction of the tangential nervous fibres lying immediately underneath the pia. After these the superficially lying fibres, and finally the radiating fibres in the more superficially lying parts of the cortex, became involved. Tuczek looked upon this fibre implication as the early and essentially the first pathological change in general paralysis.

It must be admitted that atrophy and destruction of the tangential cortical fibres is a very early change, but the question of its precedence is, if not meaningless, at any rate unimportant, when we consider the almost contemporaneous implication of the cortical elements, nervous and non-nervous. There are other arguments which could be urged against the "premature involution" theory. For instance, the association of the disease with tabes, the involvement of the whole nervous system, of the sympathetic as well as of the cranial and spinal nerves, and the peculiar and special degeneration of muscle cartilage and bone, cannot be accounted for in this way.

The causative relationship of syphilis to general paralysis has within the past few years developed from a mere assumption into almost an assured, universal belief. It has not by any means been proved that syphilis is a necessary antecedent of general paralysis, but statistics are gradually increasing in number, which confirm the opinion that, in the majority of cases, syphilis, acquired or hereditary, has preceded, at a longer or shorter interval, the appearance of the symptoms of general paralysis. That a toxine exists in the blood and in the urine in this disease has been proved by chemical analysis, and by the presence of necrotic changes in the renal epithelium. In about 70 per cent. of the cases there occurs fatty degeneration of muscle, especially of the heart muscle. There occur also degeneration of cartilage, and profound changes in the nutrition of bone. These tissue changes can only be explained on the supposition of a toxæmic condition. Mott attributes the toxæmia to the presence of cholin, which he, along with Halliburton, found in the cerebro-spinal fluid of general paralytics. Cholin, he explains, is one of the products of the disintegration of protagon, and it is known to have a degenerative action on muscular tissue. That the degeneration of nerve tissue in general paralysis is due to the automatic formation within the system of a poison like cholin, is, to say the least of it, somewhat difficult to believe, and such a hypothesis is, moreover, without analogy in medicine. It is not disputed that the presence of cholin may be injurious, or that it is a product of nerve degeneration; but one is almost compelled to the opinion that cholin is set free, owing to the disintegrating action upon the nerve elements of some other more vigorous toxine produced outside the nerve centres. What is that toxine? A strenuous attempt to answer this question will be found in the papers read this year by Bruce and Ford Robertson before the Edinburgh Medico-Chirurgical Society.[1] These papers are conjoint only in so far as they are co-operative and mutually corroborative; the one is purely clinical, the other purely pathological. In the clinical paper the author, Bruce, seeks to establish the fact that the symptoms of general paralysis are caused by a bacterial toxine, which is constantly or intermittently poured into the system, presumably from the intestinal canal. The clinical basis for such a hypothesis is briefly as follows:—(1) The temperature in the disease is intermittent, and when carefully recorded is found in most cases to be a recurrent febrile condition, occurring every week or every fortnight. (2) When the leucocytes of the blood are carefully observed, over periods extending to several months, it is found that with every rise of the thermometer indicative of a febrile attack, there occurs a hyper-leucocytosis, averaging in some cases 20,000 to 30,000 per c.mm. (3) In the blood of one or two advanced cases there was found a motile bacillus answering in description to the *Bacillus coli communis.* (4) This fact suggested to the observer that this bacillus might be one of the sources of the toxic infection in general paralysis. (5) It was subsequently found that the blood of patients during remissions in the disease agglutinated the *B. coli communis* in 70 per cent. of the experiments. Such, briefly, is the clinical presentation of the case.

On the pathological side, Ford Robertson has given the following statement of his investigations:—After concurring with Dr. Bruce's views regarding the character of the gastro-intestinal disturbances, found in cases of general paralysis almost without exception, he proceeds to give the results of his own researches into the post-mortem changes which he found in the gastro-intestinal tract in cases dying from this disease. He examined twelve cases of the disease with seven control cases—(1) Eight of the twelve exhibited well-marked thickening of the wall of the stomach. In five cases there was also thickening of the duodenum and upper part of the jejunum. (2) In the majority of the cases there were localised congestions of the mucous membrane of the small intestine accompanied by abnormal secretion of mucus. (3) In most of the cases the colon showed signs of congestion. It was sacculated and distended, and its walls were indurated. (4) With one exception the histological examination of the stomach revealed signs of long-standing catarrh. (5) Thickening of the lower end of the ileum was found to be caused by a similar catarrh, accompanied by fibrous overgrowth in the other coats. (6) Amongst the degenerated and proliferated cells of the stomach and intestines bacteria of various kinds were found in profusion, and similar bacteria were found in the blood of some of the cases.

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[1] *Brit. Med. Journ.*, London, 1901, vol. i. p. 1600.

Regarding the significance of these gastro-intestinal lesions, the author believes that they are not the cause of general paralysis, but are effects of the same toxic condition as that which induces the other lesions already enumerated. "Histological examination," he says, "shows most conclusively that the chronic catarrhal changes are a reaction to irritants that bathe the internal surface." Both authors conclude that general paralysis depends upon a condition of gastro-intestinal auto-intoxication, which results from excessive growth of the micro-organisms which normally inhabit the alimentary tract.

The facts and hypotheses of the two papers quoted are too important to be neglected in the present crude state of our knowledge regarding many of the points raised by them. It is not so much a question of whether the work of the authors shall ultimately be confirmed, or greatly modified, by the researches of themselves or of others, as of the value of the new field of research it has trenched upon. A few of their cardinal facts will certainly survive future investigation, for they correspond with previous fragmentary though uncollected observations by others. With regard to their conclusions, it may be remarked that they appear to be weightier than the somewhat slender array of facts upon which they are based would seem to justify. On the other hand, these researches have undoubtedly advanced our knowledge, for, should the greater portion of the results obtained prove to be erroneous, there will remain a suggested line of research which must be traversed before our knowledge of general paralysis can advance.

It remains to consider what are the established factors up to the present time in our knowledge of the toxæmic causation of general paralysis. (1) That syphilis precedes, in the great majority of cases, the appearance of the symptoms of this disease, is so universally acknowledged as scarcely to require insistence upon. (2) In the great majority of cases the course of the disease is marked by recurrent febrile attacks, during which there is reason to believe that hyper-leucocytosis occurs. The fever and the increase in leucocytes point conclusively to a toxic infection of the system. The remittent character of the fever shows either that the toxine is irregularly discharged into the system, or that the system acquires periodic immunity from its influence. (3) Gastro-intestinal disturbances form a well-marked clinical feature during the course of the disease, and pathological alterations in the alimentary tract, especially in its mucous membranes, have been frequently pointed out by observers. The view that these disorders depend upon the cerebral condition is quite untenable.

Although it is premature to conclude, with our authors, that the symptoms of general paralysis are wholly referable to gastro-intestinal auto-intoxication, there is every reason to believe that such intoxication plays a most important part in the order and development of its symptoms. Before much further progress can be made in this direction, one great and important point in clinical pathology must be first cleared up, namely, the rôle of the intestinal flora, more especially that of the *B. coli communis*, in the presence of other specific infections of the organism.

THE BACTERIOLOGICAL EXAMINATION OF THE RENAL SECRETION IN CERTAIN OF THE ZYMOTIC DISEASES, WITH SUBSIDIARY DIFFERENTIAL EXPERIMENTS.[1]

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At the outset of the investigation, it was desired to ascertain whether there is any elimination of pathogenic organisms by the kidney in certain infectious diseases, and whether, from a public health point of view, it is essential that the urine should, in these diseases, be systematically disinfected.

The presence of specific micro-organisms in the renal secretion, in cases of zymotic disease, has been described by many observers, more particularly in connection with enteric fever. The subject possesses not only scientific interest, but is of serious practical importance in relation to the spread of disease and the measures to be taken in prevention of infection arising from this source. Although disinfection of the fæces in enteric fever is recognised as essential and carefully attended to, disinfection of the urine, passed independently of the fæces, has not been the routine practice, and the question of its continuous necessity throughout the illness may still be regarded as *sub judice.*

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[1] Abstract of Thesis, presented for the degree of D.Sc. in Public Health, and awarded the Gunning Victoria Jubilee Prize, 1901.

The report deals with enteric fever, scarlet fever, and diphtheria, and is divided into four main divisions—(1) Historical consideration of the question of renal elimination of organisms; (2) zymotic bacteriuria; (3) relation of cases examined, methods and media employed, results obtained, and their comparison with prior research; (4) subsidiary differential experiments.

I. Renal Elimination.—The general question of elimination of organisms by the kidneys has been tested by experiment on animals, with several organisms, by many observers, who have arrived at different conclusions; some believing that bacterial elimination may be a physiological function of the kidney, and others that no such function exists, and that if any passage of bacteria through the kidney is allowed, it is in consequence of a pathological condition of that organ. The experiments and conclusions of Biedl and Kraus, Charrin and Ruffer, Trambusti and Maffucci, Enriquez, Klecki, Fütterer, Cornil and Brault, Kannenberg, Straus and Chamberland, Wyssokowitsch, Berlioz, Sherrington, Opitz and Metin, were quoted and compared.

Reviewing the general subject of renal elimination in the light of the work of these and other observers, there must be pointed out an important distinction between elimination of organisms by the kidney and the passage of organisms in the urine, whether they gain access to it through the renal tubules or otherwise. If the kidney did possess the function of eliminating living organisms from the blood, this power should be in active use throughout the course of any illness in which organisms are found in the blood, and there ought to be no difficulty in finding them in the urine, coincident at all times with their presence in the blood. In the majority of cases of infectious disease, however, specific organisms are not constantly present in the urine, and only occur in a very moderate percentage of cases.

The healthy kidney possesses no power of casting out living organisms, though it is able to remove the products of their action; and any escape of bacteria through the kidney is only accomplished when there is functional interference with the integrity of the renal epithelium, or some congestive or inflammatory condition.

Bacteria escaping by way of the urine are usually accompanied by some other abnormal constituent; it may be blood, it may be pus, it may be albumin. A kidney which will permit the passage of albumin may be believed, *primâ facie*, to be capable of allowing the passage of bacteria, and this would lead us to expect that in infectious diseases in which renal congestion and nephritis are prominent complications, bacteria would be more likely to be present in the urine than in those diseases in which such complications are rare. Observations of typhoid bacilluria show that albumin and pus are common but not invariable accompaniments.

From the point of view of public health, it is unimportant whether specific organisms present in the urine entered it through the renal tissue or at a later stage. It is, however, important to decide whether, and in what zymotic diseases, the urine is voided in a condition to spread the disease, should the organism find a favourable environment. If in any particular disease bacteriuria is found to occur, continuously or at intervals, the prevention of infection by such an avenue becomes as much a necessity as in the case of channels earlier recognised.

II. Zymotic Bacteriuria.—The presence of specific bacteria in the urine in cases of plague and enteric fever is now an established fact, whilst in scarlet fever and diphtheria the difficulties of proof are greater, owing in the one case to some dubiety as to its specific organism, and in the other to the difficulties of cultivation.

Plague bacilluria may occur in the course of the disease or during convalescence. The bacilli are present in large numbers, and are easily recognisable, are always associated with coincident albuminuria, and persist into convalescence after recovery from other symptoms. The urine may be a pure culture of plague bacilli, but sometimes pus cocci are also present. Plague bacilli and staphylococci have been found post-mortem in the kidneys.

Typhoid bacilluria.—The presence of the *B. typhosus* of Eberth in the urine during enteric fever has been reported upon by a large number of observers, whose results differ by as much as 100 per cent. While some find it in every case with no difficulty, others, even after careful examination, have failed to identify it at all; and the general result is, that at the present time the bacillus is regarded as occurring in the urine in about 25 per cent. of all cases. The earlier observations were made at a time when the characters now known to differentiate the *B. typhosus* of Eberth from the *B. coli communis* of Escherich and its allies were unknown.

The experiments of Bouchard, Berlioz, Karlinski, Koujajeff, Neumann, Silvestrini, Borges, Blumer, Wright and Semple, Besson, Melchior, Flexner, Petruschky, Horton-Smith, Richardson, Carver, and Gwyn, were related, and their results tabulated for comparison. The important point in estimating the value of these researches, is the severity of the test to which the organism is subjected before acceptance as the *B. typhosus*. There are so many organisms which resemble it in many ways,—notably the *B. coli communis*, or rather its allies of atypical characteristics, and the organisms described by Houston as *B. typhosus simulans A*, *B*, *C*, and *D*, and the organism found by Remy in stools in cases of enteritis and gastro-intestinal catarrh,—that meagre testing might easily result in the acceptance of one of these as the genuine bacillus. Horton-Smith's definition suggests the tests which should be applied, and is as follows:—" A bacillus which often showed long threads, which possessed high motility, which was provided with eight to twelve or more cilia, which, however long kept, did not produce gas in gelatin or dextrose-gelatin shake cultures, while growing well in the substance of those media; which, even *after* one month, did not produce indol in broth cultures, nor clot milk; which, however, did produce slight acidity in milk after twenty-four hours; and which, lastly, gave a positive reaction when tested with typhoid serum: then, and not till then, I think, one is justified in saying that it is really the *B. typhosus*."

With this I entirely agree, except that I would alter the one word *after* in relation to the indol reaction to the word *within*, since I believe that no fresh typhoid bacillus gives the indol reaction in broth culture within one month, but some typhoid bacilli certainly do so later. This will be more fully referred to in a note on indol reaction in the latter part of this report. Briefly summarised, it appears from the accounts of these observers that—(1) Typhoid bacilluria is a condition of the later stages of the disease, and, if the type be a mild one, occurs with or without albuminuria of slight amount, but that it is more common in severe types, and then usually occurs in the third and fourth weeks, associated with a considerable quantity of albumin. (2) Pyuria is apt to accompany the bacilluria in a large proportion of cases. (3) It occurs in about 25 per cent. of all cases of enteric fever. (4) It is more a bladder condition than a renal one, and is possibly curable by antiseptic injections, or the administration of antiseptic medicines. (5) The organism finds the urine a very suitable medium for growth, and when present it is found in almost pure culture and in enormous numbers. The only criticism of this summary which I desire to add has reference to the prevalence, which I consider over-estimated.

Bacteriuria in scarlet fever.—Since the specific organism of scarlet fever can hardly be said to be as yet generally recognised, there is not much to be recorded as to its presence in the urine; but up to this time Klein's *M. scarlatinæ* or *Streptococcus scarlatinæ*, which appears to be identical with the *Streptococcus conglomeratus* of Kürth, has most claim to recognition as the specific organism. It is necessary to note that this organism has not as yet been obtained in the urine of scarlet fever patients. Klein has published the results of his investigation of the urine in three cases during the stage of desquamation, and in none was a streptococcus found.

Bacilluria in diphtheria.—The *B. diphtheriæ* (Klebs-Löffler) has been found in the kidney in fatal cases of diphtheria, as well as in inoculated animals. Wright found it in the latter four times out of 151 examinations, and once in the former in fourteen cases; further, in conjunction with Stokes, he found it in six cases out of thirty-one. In another series of nine cases Stokes found it present in the kidney in four. Kütscher also records finding it once, and Kanthack and Stephens twice, out of three kidney examinations in twenty-six fatal cases. These observations would lead one to expect that *B. diphtheriæ* was not uncommon in the urine; but, so far, the records and one's own experience show that this is not so. Bujwid, indeed, records having found it in the urine in conjunction with the *B. tuberculosis* in a case of tuberculous kidney, but the symptoms were those of tubercle, and not of diphtheria, so there may have been accidental contamination.

III. EXPERIMENTAL.—

Methods.—The collection of specimens was at first confined to male patients, so as to avoid as far as possible exterior contamination. The catheter was seldom used. The meatus was carefully cleansed, and then washed with a weak solution of corrosive sublimate, and micturition was performed into a flask with a sufficiently wide mouth. This flask had been previously thoroughly washed, dried, and plugged with cotton-wool; over the plug was tied a piece of filter-paper, and the whole sterilised by a heat of 150° C. for one hour. At the bedside the plug and filter-paper being removed for as short a time as possible, the urine was passed direct into the flask, the first portion of the flow being received into one flask, and the latter portion into a second similar flask. The plugs and filter-paper were at once replaced, and the flasks removed to the laboratory. Both portions were examined, as a rule, though it was expected that the former would be more likely to contain urethral organisms, and sometimes only the second portion was examined bacteriologically, the first portion being tested as to reaction and albumin. Later in the investigation, specimens of the urine were occasionally taken from both male and female patients without these precautions, with the advantage of increasing the number of specimens without repeated trouble to the patients, and enabling serious cases to be investigated without disturbing them. A disadvantage was, that one found more organisms in the urine, and consequently there was more labour involved in the separation of impure cultures, and in isolating the different species of organisms present. The quantity of urine usually obtained for each specimen was about 150–250 c.c.

Laboratory procedure.—From the sterile flask the urine was transferred to a narrow glass cylinder, previously sterilised with strong sulphuric acid, and thoroughly washed with water, and then with sterile distilled water. Into this was passed a filter-bougie, either of the Pasteur-Chamberland or Nordtmeyer-Berkefeld pattern, which had been sterilised, and which was connected by sterilised rubber tubing with a filtering flask, which in its turn was connected with a safety flask, and that with a Giesler pump attached to the main water tap. The filtering flask was sterilised in the same way as the glass cylinder, if it was desired to obtain a sterile filtrate, but in the ordinary examination of urines this was not necessary. The mouth of the glass cylinder was covered with sterile filter-paper during filtration.

The urine having been filtered through the bougie, by means of the suction pump, the bougie was removed, and its exterior washed into a sterile beaker with 10 c.c. sterile distilled water, by means of a sterile brush. These washings thus contained all the organisms present in the specimen of urine. After mixing by shaking the whole washings, a portion, generally 0·6 to 1 c.c., was added, by means of a sterile pipette, to a tube of 10 c.c. of ordinary or phenolated broth. The broth was incubated for one night at 37° C., *i.e.* for about eighteen hours, and next day another tube of 10 c.c. of broth was inoculated from this, and incubated for one hour at 37° C. Plates were then prepared, and if of agar were incubated at 37° C., if of jelly at 24° C. All plates were kept from one to two weeks, unless liquefaction of gelatin rendered them useless before that time. Each kind of colony in the plates was examined microscopically, and a series of cultures in ordinary or special media made of each. From these the characters of the different organisms were ascertained, and they were identified as far as possible, and in all cases sufficiently to exclude known pathogenic species.

Incubation of the specimens of urine themselves for twenty-four to forty-eight hours, at 37° C. before cultivation, which in the hands of Wright proved so effectual, was frequently tried, but always with disappointing results, since invariably the urine was found at the end of that time to be swarming with organisms, many of which were cocci.

Plates were occasionally prepared direct from the urine, but on the whole the method given above proved most satisfactory, and rendered it unnecessary to try the method, substituted by Carver, of using cotton-wool as the filter.

Media.—The media employed were—(1) alkaline 1 per cent. peptone broth; (2) litmus broth; (3) phenolated broth (0·05 per cent.); (4) nutrient jelly (10 to 20 per cent.); (5) glucose jelly (2 per cent.); (6) jelly medicated with phenol (0·05 per cent.), formalin, the essential oils of peppermint, cloves, cinnamon, or eucalyptus, or rectified spirit; (7) Remy's jelly; (8) agar-agar; (9) agar-gelatin; (10) blood serum; (11) potato; (12) milk; (13) alkali-peptone bouillon (Peckham); (14) casein-peptone solution; (15) tyrosin solution. The only one of these whose preparation has not been published is—

Casein-peptone solution.—This medium is thus prepared. Into a flask put 10 grms. casein (commercial), add 250 c.c. of distilled water. Mix by shaking. Raise the temperature to 37° C. When this temperature is attained, render alkaline with solution of sodium bicarbonate (10 per cent.). To the contents of the flask add 2 grms. of Grübler's trypsin (Kühne), and shake thoroughly. Then keep for one hour at 37° C., shaking occasionally during this time. Test reaction and make alkaline as before. Keep for one hour longer at 37° C. After this time the mixture is boiled for three minutes. Then place the liquid in the autoclave for one hour, under pressure at 110° C. Cool and filter. Filtration is very slow when the reaction is alkaline. Next acidify the filtrate with dilute acetic acid, which throws down a precipitate. Filter again, and obtain a clear filtrate. To the clear fluid add 1·25 grms. of sodium chloride. Make the reaction slightly alkaline to turmeric paper. Make up quantity to 250 c.c. with distilled water. Tube and sterilise in the autoclave, without pressure, for twenty minutes, on each of three successive days.

Note.—Before tubing, test a portion for indol and for peptone; it should be free from indol, and it should give with the biuret test positive indications of the presence of peptones. The solution usually contains nitrite.

(A) Enteric fever.—*Cases and specimens.*—I obtained the urine of forty-five cases of enteric fever in the Edinburgh and Leith hospitals, and examined 158 specimens, and in only one case have isolated the *B. typhosus.*

Widal reaction.—All forty-five cases gave a positive Widal reaction, and illustrated clinically different types of enteric fever.

Sex and age.—The forty-five cases were distributed almost equally between the sexes, twenty-four being males and twenty-one females. The ages ranged from 3 to 48 years, over 60 per cent. being between 10 and 30. The positive case was that of a female æt. 27.

Severity.—The cases examined were, on the whole, of a mild type, and only two deaths occurred in the forty-five, showing a lower case mortality than is customary in the disease. That the cases were a fair sample of the disease, as occurring in this district, may be supported by a consideration of the statistics of the Edinburgh and Leith hospitals, which show that, as a rule, the case mortality is not high.

Stages of disease.—The specimens were taken at all stages of the disease except in the very earliest days, and in time covered from the first to the thirteenth week of the disease. Most of the specimens were taken in the third, fourth, fifth, and sixth weeks, when one might expect to find bacilluria if it occur in any large percentage of cases.

Albuminuria.—Of the forty-five cases, eighteen showed albuminuria at one stage or another; but of these, six only contained mere traces in unimportant amounts and of short duration, ten were characterised by moderate amounts, and in only two were large quantities of albumin present.

Pyuria.—Pus was only observed in one case, and then was accompanied by the *B. typhosus* and *B. coli communis.*

Bacilluria.—Owing to the specimens being sometimes taken without strict bacteriological precautions, the urine was seldom sterile or contained a pure culture, but occasionally this happened, especially when such precautions were taken. The specific organism was only present in one case, but coliform bacilli were very common, and their varieties are discussed in a special note. A specimen which was taken post-mortem contained a pure culture of *B. coli communis.*

Media.—For enteric urines the media which proved most useful were phenolated broth, phenolated jelly, and Remy's gelatin medium. In the positive case the *B. typhosus* was recovered equally well in plates of phenol jelly and Remy's gelatin medium, but the latter is preferable where mixed cultures, and it may be liquefying organisms, are encountered.

The *B. typhosus* isolated from urine was submitted to all the tests which distinguish it from *B. coli communis,* and which are enumerated later, before it was accepted as undoubtedly Eberth's bacillus.

Methods.—With enteric urines, in addition to the general method formerly described, I tried other methods of treating the specimens, but found none of them superior. The incubation of the urine at 37° C. before cultivation did not give satisfactory results even in those cases in which great care had been taken in collecting the specimen.

Direct cultivation from the urine itself, without filtration, occasionally gave good results, but only a small quantity of urine can be used in this way, and, if negative, such a test alone would not warrant the conclusion that there was no typhoid bacilluria. If the *B. typhosus* were present in pure culture, I believe direct cultivation would be good, but I have not met with such a condition. On the other hand, by filtering a large quantity of urine, one obtains all the organisms present, and in a fair sample of the washings can hardly fail to find the specific bacillus if it is present.

Case of typhoid bacilluria.—The patient was a female, æt. 27, and her case was a serious one, with delirium as a main feature. The urine contained a large quantity of albumin and some pus; the albuminuria commenced on the twenty-sixth day, and traces were present up to the sixtieth day. The temperature fell to normal on the forty-fifth day of the disease. The *B. typhosus* was present in the urine on the thirty-eighth, forty-first, fiftieth, and fifty-first days, at first in large numbers, and it was absent on the sixty-second day. It was not present in pure culture, and was accompanied by *B. coli communis* and sometimes cocci.

The urine at first was loaded with urates, and one was not able to recognise the "shimmer" described by Horton-Smith, or at that time the characteristic turbidity.

Examined microscopically, a drop of the urine showed pus cells and numerous organisms, both motile and non-motile, but no casts. The later specimens were turbid, and the urine was always acid notwithstanding the presence of pus.

Typhoid bacilluria.—Comparing my experience with that of others, it appears to me that there are two types of typhoid bacilluria.

1. The one is a condition occurring in severe cases of the fever, generally commencing during the height of the disease—that is to say, seldom in the first fortnight, frequently in the second fortnight, or later, associated always with albuminuria, often with pyuria, sometimes with hæmaturia, diminishing as the urine contains less albumin, and disappearing a few days or a week after the albumin. This type may merge into the second type, especially if cystitis has been set up, for this renders the disappearance of the organisms unlikely to occur so early as in more favourable circumstances. The case described above may be regarded as an instance of this first type.

2. The second type is characterised by its commencement in the later stages of the disease (it may be after the temperature has fallen to normal), by its persistence into and during convalescence, even for weeks, and it may be months, without causing severe symptoms, by its occurrence in comparatively mild cases as well as in those which have been severe, and by albuminuria not being an invariable accompaniment. There may be more or less

cystitis, but it is not constant. I have not met this type in these forty-five cases, and I am satisfied that it is not so common in Edinburgh as in some other places.

Prevalence.—At the present time, chiefly owing to the results of Richardson and Horton-Smith, typhoid bacilluria is regarded as occurring in 25 per cent. of all cases of enteric fever. I am convinced that this proportion is too large, at all events it is not found in this district in anything like so great a percentage; and there are now a considerable number of observers who have recorded a smaller percentage, notably Blumer and Petruschky. The explanation is probably to be found in the type of disease. I think if all the mild cases were examined as thoroughly as the grave ones, a considerably smaller ratio would be found to be the rule. Taking my own figures, the ratio would be only 2 to 3 per cent., but then, as I have pointed out, the cases were not severe, and this percentage is probably less than the actual ratio. If it be admitted that bacilluria results from the proliferation in the bladder of stray organisms which have passed through the kidney from the blood, and if bacilluria occur in 25 per cent. of cases, then the bacilli must be in the blood in more than 25 per cent. of cases, or if only present in that percentage they must escape every time. Now Kühnau's researches have shown that *B. typhosus* can only be found in the blood in about 25 per cent. of cases of enteric; and if we accept this as approximately true, it would appear that the kidneys eliminate or allow the passage of the organism every time, but this is a conclusion negatived by many experiments referred to in the section on renal elimination. To maintain the bacilluric percentage at 25 per cent., it is necessary to consider the possibility of organismal access to the bladder by another channel, namely, through the anterior rectal wall, and this has been suggested, I believe, by Blumer. I prefer, however, to consider that the organisms reach the bladder through the kidney, but in a smaller percentage of cases than 25 per cent.

Bacilluria and the public health.—It is from the second type of typhoid bacilluria that the health of the public has most to fear. Cases apparently recovered may still infect the community, and possibly the Long Orton epidemic reported by Walker may have been due to this cause. The fact that such a type of disease exists would suggest the necessity of a bacteriological examination of the urine in each case immediately before discharge from hospital or return to communal life. This is not the place to discuss the clinical treatment of bacilluria, but the most successful drug for internal administration appears to be urotropin; and in view of the very small amounts of formalin which by experiment I have found inhibitory to the *B. typhosus*, there is no difficulty in crediting the rapid beneficial effect of this compound.

Prophylaxis.—That the urine is indeed infective, and that the organisms are not cast out in a state incapable of doing harm, has been definitely proved by a case related by Petruschky, in which the infection was conveyed by a drinking glass which had been used as a urinal. It is therefore imperatively necessary to disinfect any urine containing the bacillus, and for this purpose half its volume of 1–40 carbolic acid solution, or of 1 per cent. formalin solution, or one-twentieth of its volume of 1–2000 corrosive sublimate may be used. Intimate admixture of the disinfectant with the urine is necessary for half to one hour.

Sterilisation by heat would be preferable, since it avoids the risk of imperfect admixture, and it would not be difficult to devise an efficient apparatus for routine use in such cases in hospital.

(B) Scarlet fever.—I have examined by the same method the urine of sixteen cases of scarlet fever, fifty-one specimens being used for cultures, and I have found in seven cases, at one period or another, streptococci, of which a description is appended. Specimens taken with bacteriological precautions, as well as those not so taken, contained these streptococci.

Phenolated broth and jelly were not used in these cases. Of the sixteen cases ten were males and six females, and their ages ranged from 3 to 42 years.

Specimens were taken at all periods of the disease from the first week to the fifteenth week, but mostly during the first six weeks. Albuminuria was present in ten, and nephritis in five of the sixteen cases.

Bacteriuria.—Two varieties of streptococci were met with and described as Streptococcus 1 and Streptococcus 2. Other organisms which were present do not require description, being common, non-pathogenic species, but the coliform bacilli are separately described.

Streptococcus 1.—*Morphology and cultural characters.*—*In 1 per cent. peptone broth at 37° C.*—In twenty-four hours there is slight general turbidity, and in a few days the growth is most marked at the bottom of the tube in small coherent masses: this character becomes more pronounced in a week or ten days. Examined in hanging-drop, the elements are seen to be single or in pairs, or in short chains of four to six elements in each. The chains are seldom straight, but appear incurved, and the end elements are sometimes larger, more spherical and refractile than the rest.

Indol reaction.—The organism gives a positive indol reaction in broth after several days, generally eight to ten.

On agar at 37° C.—Small grey dots coalescing to form a streak with a moist surface. The agar fluid shows some growth in mass, and this microscopically is the same as the broth culture.

In stab jelly at 24° C.—A delicate filmy sheath of slow growth, composed of fine grey colonies, forms along the whole course of the stab. At the deeper end there are isolated, rounded, small grey colonies, but over the surface it spreads as a greyish white growth. There is no liquefaction or gas formation.

In gelatin plate.—Small greyish white, non-liquefying colonies, circular in shape.

In glucose jelly at 24° *C.*—Gas is formed after several days, less often in twenty-four hours.

In milk at 37° *C.*—Coagulation with acid formation in forty-eight hours.

On blood serum.—As on agar.

In litmus broth.—Acid is produced in twenty-four hours.

Streptococcus 1 was present in the urine in two cases, and in both it was associated with albuminuria. It appeared late in the disease, namely, in the fourth and tenth weeks respectively, and was not present later when the albuminuria had ceased.

Streptococcus 2.—*Morphology and cultural characters.*—*In* 1 *per cent. peptone broth at* 37° *C.*—After twenty-four hours there is slight general turbidity throughout the tube, but the chief growth is in mass at the bottom, whence it can be shaken up in viscid threads and flocculent masses. After a few days there is marked general turbidity, with large deposit at the bottom of the tube resembling pus in urine. In ten days the broth is viscous and mucoid. With a power of 800 diameters, and examined in hanging-drop, the elements are recognised as cocci, either single or in pairs, but mainly in chains of short length, consisting of six to ten elements, or it may be up to twenty elements in each. The elements are of small size.

Indol reaction.—Broth cultures give a positive indol reaction in a week or ten days, but in casein-peptone solution the reaction is positive on the fourth day.

On agar at 37° *C.*—A flat, white-grey growth (not differentiated into separate colonies) with crenated edges and a moist glistening surface. There is some growth in mass in the expressed fluid at the bottom of the agar tube.

In gelatin plate.—In twenty-four hours the colonies have a pearly-grey opacity and a smooth, glistening, raised surface. If kept at room temperature for a fortnight, the plate shows both superficial and deep colonies. The superficial are white, raised, with very slight central depression, and resemble drops of wax. They have a glistening appearance, and an outline roughly circular. The larger and older colonies are sometimes concentrically ringed. The deep colonies are small, and are oval or circular in shape.

In stab jelly, growth occurs along the whole stab as a white or white-grey sheath, and towards the bottom of the stab isolated, rounded colonies are formed. There is no liquefaction, and there may be some gas production along the stab. On the surface of the jelly a white growth extends well over the surface, and has a more or less irregularly crenated margin.

In glucose jelly at 24° *C.* gas is produced generally within twenty-four hours.

In litmus broth at 37° *C.* acid is produced rapidly, the colour changing in twenty-four hours.

In milk at 39° *C.*—Coagulation and separation of whey in forty-eight hours, often in twenty-four hours. The whey is colourless and acid in reaction.

On blood serum the appearance resembles that on agar, but the growth is, if anything, more white and plentiful.

Streptococcus 2 was present in five cases, in only two of which was the urine albuminous.

Comparison and contrast with other organisms.—Referring to the identity of the organisms here described as Streptococcus 1 and 2, I was for some time in doubt as to whether either was the same as the *Streptococcus scarlatinæ* of Klein (*Streptococcus conglomeratus* of Kurth). Owing to the courtesy of Dr. Klein (at whose request Dr. Gordon most kindly supplied me with a culture of Dr. Klein's organism, for which I am much indebted to him), I was enabled to compare the organisms and to satisfy myself that there were marked differences between them.

Contrasting Streptococcus 1 with Klein's organism, it resembles it in the acid production and coagulation of milk, but differs in producing gas and indol, and in the minor degree of coherency which it exhibits. The growth in broth is both more diffuse and profuse.

Streptococcus 2 is not at all like Klein's organism: the viscous growth in broth alone would serve to discriminate between them, even without the additional qualities of gas and indol production. My experience of the streptococci has served to convince me that Gordon is correct in stating "that chain formation is only an incident in the life history of a streptococcus."

Nothing is more easy than from microscopic examination of the unstained specimen alone to mistake the spindle and rod shaped elements of a streptococcus for a bacillus, or to look upon masses of cocci as possessing no relationship to an organism whose chief morphology is streptococcal. Still further to deceive the casual observer, streptococci show not infrequently large spherical elements which closely resemble in size and refraction, and sometimes also in staining properties, the spores of spore-bearing organisms, and may be, in fact, something of a similar nature, as has been suggested by Klein. These things render it extremely difficult to discriminate the true nature of the organism, which is only fully disclosed by a series of cultures, and by a careful observation of its behaviour in fluid media.

Streptococcus of Baginsky.—Lately Baginsky and Sömmerfeld have described a streptococcus which they found in forty-two fatal cases of scarlet fever to be present in the organs, the blood, and bone-marrow in every case, and which they also found in the throat during life.

Its morphology and cultural characteristics, as described by them, are very similar to those of Streptococcus 1, but I am not able to state absolutely that it is the same. The organisms appear to agree in the character of their growth on agar, the power of forming gas in glucose jelly, and of acid production with coagulation of milk, and in their microscopic characters.

(C) Diphtheria.—I have examined seventeen cases of diphtheria and forty-three specimens of urine, without in any case isolating the *B. diphtheriæ* of Löffler. The media employed were somewhat different from those used in enteric and scarlet cases, agar and agar-gelatin being used for plates as well as nutrient jelly. No medicant was added either to the broth or plates.

Of the seventeen cases, three were males and fourteen females, the majority being under 10 years of age, and the specimens were almost equally spread over the first three weeks of disease, only a few being taken in the fourth week. Albuminuria was present in five cases, and Löffler's bacillus was present in the throat in fourteen cases, either alone or accompanied by cocci. Antitoxine had been administered in all the cases in amounts varying from 3000 to 14,000 units.

Bacteriuria.—In two of the cases a bacillus, morphologically bearing some resemblance to *B. diphtheriæ*, was present, but it was decolorised by Gram's method, and was not the bacillus of Löffler; other organisms met with were cocci, coli, and fluorescens, which do not require description, and a streptococcus, denominated Streptococcus 3, which occurred in three cases.

Streptococcus 3.—*Morphology and cultural characters.—In 1 per cent. peptone broth.*—A turbid growth, without viscosity, but containing coherent mass formations. The elements are small, often in pairs, and the chains short, with generally about six constituents. The broth is not rendered acid. The indol reaction is positive on the twelfth day, with or without the addition of nitrite as well as acid.

In gelatin plate at 24° *C.*—In twenty-four hours the colonies are growing as grey, cloudy, granular colonies, superficially resembling coli, and non-liquefying.

In stab jelly, a delicate growth of isolated grey small colonies along the stab, no gas or liquefaction.

In glucose jelly, shake culture at 24° *C.*—There is no gas formation, but the organism grows in the medium without liquefaction.

In milk at 37° *C.*—Coagulation occurs within a week.

On agar, a moist, whitish grey growth along the streak, not showing individual colonies, and not so copious as Streptococcus 2. In the expressed fluid, growth possesses the same microscopic characters as in broth.

IV. Subsidiary Differential Experiments.—

On various points connected with the research, subsidiary experiments were conducted, the results of which are here briefly mentioned.

(a) *Sterility of normal urine.*—Control experiments were performed with the urine of healthy persons to test the methods used in the research, and gave satisfactory results. Such urine is more often sterile than that of the sick, possibly owing to the increased difficulty of collection, or to the presence of a larger number of organisms in the urethra in the latter.

(b) *Urine as a culture medium for* B. typhosus.—Sterile urine of healthy persons and of enteric fever patients was found to be a suitable culture medium for *B. typhosus*, though in the latter the organism moved with less of its characteristic rapid wriggle.

(c) *Varieties of* B. coli communis.—The typical form was by far the most common, but several atypical forms were met with; their deviation from type is sufficiently indicated in the Table.

Comparison between the varieties here enumerated and the comprehensive classification of varieties of *B. coli communis*, drawn up by Dr. Gordon, shows that some of these corresponded very closely.

Varieties of Bacillus coli communis.

	Naked-eye Appearance of Colonies in Gelatin Plate.		Microscopic Characters.			Agar.	Milk.	Glucose Jelly.	Indol Reaction in Broth Culture at 37° C.	
	Superficial.	Deep.								
	Blue-grey Colour, irregular Margin and Shape.	Khaki Colour, Circular or Oval.	Gelatin Plate Colonies, Deep under Low Power.	In Hanging-Drop, High Power, Short Motile Bacillus.	Flagella, 1 to 4.	Copious Opaque Growth in 24 Hours, at 37° C.	Coagulation with Acid Production in 48 Hours.	Gas Formation in 24 Hours, at 24° C.	Positive test gives Pink Colour within 7 Days.	
1	+	+	+	+	+	+	+	+	+	Typical.
2	+	+	+	+	+	+	0	+	+	Atypical.
3	+	+	+	+	+	+	+	+	0	,,
4	+	+	+	+	+	+	+ After 7 days.	+	0	,,
5	+	+	+	+	+	+	+	+	+ After 11th day.	,,
6	+	+	+	+	+	+	+	0	0	,,
7	+ Colonies have very irregular edges.	+ Deep colonies, blue.	+	+	+	+	+ After 5 days.	+	+	,,
8	+	+ Deep colonies, blue.	+ Multinuclear.	+	+	+	0 Alkaline reaction.	+	+	,,
9	+ Circular.	+	+	+	+	+ Scanty.	+	+ After 8–11 days.	+	,,
10	+ Circular.	+	+	+	+	+	+ In 5 days.	0	+	,,
11	+	+	+	+	+ One only.	+ Scanty.	+	+ In 3 days.	+ After 30 days.	,,
12	+	+	+	+	+	+	+ In 5 days.	0	0	,,

(*a*)	No.	2	resembles	Gordon's	variety,	vi.	
(*b*)	„	4	„	„	„	iv.	
(*c*)	„	6	„	„	„	xiii.	
(*d*)	„	8	„	„	„	i.	among the alkali producers.
(*e*)	„	10	„	„	„	xi.	
(*f*)	„	12	„	„	„	xiv.	

(D) *Tests used to distinguish* B. typhosus *and* B. coli communis.—Reliance was placed upon—(1) motility; (2) flagella; (3) gas formation; (4) coagulation of milk; (5) growth on potato; (6) indol reaction within certain limits; (7) rate of acid production in litmus broth; (8) Widal reaction, agglutination; (9) rate of growth in gelatin plate; (10) growth in semi-solid media.

Influence of B. coli communis *on* B. typhosus *in mixed culture.*—Numerous experiments showed that the recovery of the *B. typhosus* from the mixed culture depends on—(*a*) the vigour of the stock of typhoid organism used; (*b*) the time elapsed after inoculation of the *B. coli communis;* (*c*) the method used to separate the organisms.

(E) *Experiments with medicated media.*—The medicants used were phenol, formalin, sp. vin. rectif., and the essences of peppermint, eucalyptus, cloves, and cinnamon, and many experiments were conducted with varying proportions of the medicant. The conclusions arrived at were—(*a*) That 0·05 per cent. phenolated media would be useful in restraining undesirable organisms present in the urine, while allowing any typhoid and coliform bacilli to grow. (*b*) That formalin was too fatal to typhoid to be used in examining enteric urine, but that 0·0125 per cent. formalin jelly might aid in deciding whether a particular organism was typhoid or colon, since it is fatal to the former, while allowing the growth of the latter. (*c*) That the essential oils likewise would be of little use, since, except in the case of eucalyptus, small quantities sufficed to prevent the growth of typhoid, and all of them were less inimical to *B. coli communis* than to *B. typhosus.* (*d*) That cinnamon and cloves were much more powerful than peppermint and eucalyptus in restraining the growth of *B. coli communis.* (*e*) That rectified spirit alone does not prevent the growth of either typhoid or colon bacillus unless present in very large proportions, and this is especially the case as regards *B. coli communis.*

(F) *Note on indol reaction.*—The indol reaction has been much relied upon as a valuable distinction between *B. typhosus* and *B. coli communis.* Within certain limits this is still the case, but the reaction is not a fundamental distinction between the organisms. Typical *B. coli communis* gives the indol reaction in broth culture after incubation for five days or less at 37° C., but there are atypical varieties in which the reaction is delayed for varying periods up to a month, and there are some which do not give it at all. That the typhoid bacillus would ever give the indol reaction in broth was unknown to me, until I happened to apply the test to some old cultures, and found that it did so. On investigation, I found that Chantemesse had previously recorded the same observation, and that Peckham had found that *B. typhosus* will assume the indol function under special conditions, conditions which also favour the increase of indol production by the

B. coli communis, and which may in time cause the latter organism to lose its power of indol production.

The medium used by Peckham is termed by him "alkali-peptone bouillon," and in it seventeen stocks of *B. typhosus* all gave indol by the fourth generation, each generation representing three days' growth. Experiments were instituted to investigate the subject, and I found that—

1. In 1 per cent. peptone broth the *B. typhosus* will give the indol reaction after incubation at 37° C. for ten to twelve weeks.

2. If now this organism be inoculated into fresh broth, and incubated at 37° C., it will give the indol reaction in seven to ten days; or if it be plated on agar, and thence transferred to broth, the indol reaction may be obtained in the same time.

3. If the *B. typhosus* be cultivated anærobically on agar for six weeks at 37° C., and if then it be inoculated into broth and incubated aërobically at 37° C. for twelve days or a fortnight, it will give the indol reaction.

The same bacillus cultivated anærobically in broth gave the indol reaction in ten to twelve weeks, much the same time as in aërobic cultivation.

4. In alkali-peptone bouillon the *B. typhosus* produces indol. I did not obtain the reaction in the earlier generations, and did not discover the reason of the difference between Peckham's experiments and my own until I tested the alkali-peptone bouillon, and found that it contained either nitrite or some substance with a similar action. The addition of acid alone gave the indol reaction at the twelfth generation of *B. typhosus*. Probably indol had been produced in the earlier generations, in accordance with Peckham's results, but excess of nitrite had prevented the reaction.

The presence of nitrite in the bouillon before inoculation was proved by three tests, all positive in their results—(*a*) Indol + H_2SO_4; (*b*) metaphenylene-diamine test; (*c*) iodide of zinc and starch solution test.

5. The *B. typhosus* will in a suitable medium produce indol within a week, usually on the fourth or fifth day. I prepared a medium which I termed casein-peptone solution, the actual preparation of which has been detailed above, but is only tentative, since possibly it could be more simply prepared without loss of its value as a medium for testing indol production.

This solution I found also contained a small quantity of nitrite, which was not present in the original casein.

In casein-peptone solution, four stocks of *B. typhosus*, obtained from different sources, all gave the indol reaction by the fifth day. A most important point in connection with the indol reaction is the amount of nitrite solution required in the test. Any excess of nitrite prevents the reaction, so the solution used must not exceed 0·02 per cent., and of this 0·1 to 0·5 c.c. is sufficient to test 10 c.c. of broth or other medium.

It is well to remember that the medium may itself contain nitrite, and to abstain from using a medium in which this is in excess.

(σ) *Tyrosin experiments.*—Neither *B. typhosus* nor *B. coli communis* produce indol when incubated in tyrosin solution (1 part of tyrosin to

2000 distilled water). The addition of tyrosin solution to broth does not intensify the indol reaction produced by *B. coli communis*, nor does it induce the early production of indol by the *B. typhosus*. It is unlikely, therefore, that tyrosin is a stage in the production of indol from peptone by these organisms.

CONCLUSION.—It is not necessary here to recapitulate the results of each section of the report; they have been summarised in their respective portions. It may be advisable, however, to emphasise one or two of the main facts.

1. That pathogenic organisms may be present in the urine in some zymotic diseases, notably plague and enteric fever, but the percentage of cases showing typhoid bacilluria is small.

2. That the spread of the infection of enteric fever by means of the urine must be prevented in the interests of the public health. Fortunately, the risk is not attached to every case, but the insidious nature of the bacilluria demands that no enteric fever patient should be discharged from supervision, until the absence of bacilluria has been proved. In those cases in which bacilluria has occurred during the course of the disease, its cessation must be proved by bacteriological examination of the urine, before the patient is allowed to resume ordinary life. It would be a counsel of perfection to recommend a similar examination in all cases; but so large a percentage of cases never have any bacilluria at all, that this course would entail much unproductive labour. By careful daily observation in every case of the appearance of the fresh urine, during the fortnight before the discharge of a patient, the physician should note any cloudiness or turbidity, or any sediment. These are valuable guides as to those urines in which further examination is desirable. The reaction of the urine is no guide, since a normally acid urine may contain the bacilli, and is more likely, indeed, to contain a pure culture of typhoid bacilli than an alkaline urine. The nature of sediments should be determined, and all urines observed to be cloudy should be examined bacteriologically. By this course I believe that typhoid bacilluria might be detected, and measures could then be taken for the prevention of infection by it.

3. The influence of other organisms on the *B. typhosus* in mixed cultures varies with the relative vigour of the respective stocks thus mingled. The typhoid organism is usually the less hardy, and as time goes on there is greater difficulty in isolating it.

4. That there are a large number of organisms, intermediate between the *B. typhosus* and the *B. coli communis*, approximating more or less closely to one or the other type. Their relationships require further elucidation.

5. No fundamental distinction exists between *B. coli communis* and *B. typhosus* in the matter of indol production. Both are indol-producing organisms in suitable media. The indol reaction

in 1 per cent. peptone broth is a valuable discriminative test between the two organisms, *only* when the typhoid organism is freshly cultivated, and the *B. coli communis* is typical.

6. That casein-peptone solution is the best medium for testing powers of indol production.

7. That Remy's jelly, alkaline-peptone bouillon, and casein-peptone solution, are useful additions to the list of media.

This research has been rendered possible by the kindness of the Senatus Academicus of the University of Edinburgh, in allowing me to work as a research student in the Public Health Laboratory of the University. I am very much indebted to Professor Hunter Stewart for placing at my disposal the resources of the laboratory, and for facilitating the work by much personal interest and advice of great value. Also I desire to thank most cordially, Dr. Ker, superintendent of the Edinburgh City Hospital, and Dr. Porter, late resident physician, Leith Public Health Hospital, for permission to collect and examine the specimens, and for furnishing me with details of the respective cases.

A PLEA FOR THE SYSTEMATIC TEACHING OF HEREDITY.

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(*Concluded from page* 421.)

We have now passed in review the whole range of the arguments that have been advanced in support of the Lamarckian doctrine. We have limited ourselves to evidence, and our inquiry, therefore, has been conducted purely on scientific lines. But, unfortunately, many biologists have not exercised a similar self-restraint. We must perforce follow them in a plunge into mythology.

For thousands of years men have been guessing at heredity. Every savage race however ignorant, every religious system however preposterous, has made its guess. Greek mythology was full of guesses. At the other extreme some Australian aborigines believe that the woman is rendered pregnant, not by the male, but by disembodied spirits. Young and handsome women, who dread the cares of motherhood, creep cringingly past high rocks, the reported abiding-places of spirits, declaring that they are old and unlovely. The scientific study of heredity, the careful consideration of evidence, began with Darwin. But the clue to the problem had been furnished many years before, when it was discovered that every cell arose from *a* preceding cell—when, in fact, it was discovered that the multicellular organism arose, not from the whole of the parent, but only from a single cell. To the seeing eye it should then have been plain that the transmission of acquirements was impossible, or, at least, highly improbable. But there is no veil like the veil of familiarity. But even Darwin failed to appreciate the bearing of this great discovery. Instead of working up to theories of evolution through theories of heredity, biologists worked down to theories of heredity through theories of evolution. It was done in a very curious fashion. Numbers of eminent gentlemen—Spencer, Darwin, Haeckel, Elsberg, Galton, Nägeli, His, Brooks, Hertwig, De Vries, Weismann, Romanes, and quite lately, Adami—set about making guesses as to *how* parents transmitted characters to offspring. Every eminent gentleman disagreed in the main from every other eminent gentleman, but they were all united on one important point. None troubled about producing evidence. No evidence in truth was obtainable. But that should have furnished a reason for not theorising, not an excuse for an unlimited indulging in it. The whole discussion was completely in the air, and furnishes an instructive example of how scientific investigation ought *not* to be conducted. It was as if some one had said that there was green cheese in the moon, and had founded thereon an elaborate theory about cows and verdant pastures, dairymaids, farmers, cheese factories, consumers, an organised society, and so forth; and as if every one else, instead of asking for evidence of the existence of green cheese, and refusing, in the absence of evidence to discuss the theory, had proceeded quite seriously, and, as a rule, with great courtesy and some mutual laudation, to wrangle elaborately about the theory in all its details.

We know little more about the mechanism of heredity in multicellular organisms than that offspring are derived from single cells. The higher powers of the microscope have revealed some interesting phenomena in the nucleus of the fertilised ovum, curious movements of the chromosomes and the like, but we have no clue as to their meaning. The germ cell of any plant or animal does not differ in essential particulars, so far as appearances go, from the germ cell of any other plant or animal. Thus, there is nothing in the germ cell of an elephant which indicates why it should not develop into a mouse or a lichen. We can only *surmise* that the processes of development—vital, chemical, or what not—are of enormous complexity, as they certainly are of profoundest mystery. To go beyond verifiable evidence is not science, but a negation of science. Nevertheless, as I say, various eminent biologists have thought, or at any rate have acted, differently. For the last twenty or forty years there has been a deluge of mystical and useless chatter about matters which are quite unknown, and which from their complexity are probably quite unknowable. But since, with the exception of that immortal part of Darwin's work which was founded on evidence, the biological world has done little thinking except about these precious "working hypotheses," it is worth while to devote a few pages to the discussion of two or three of the more prominent among them. We shall not learn much that is useful, but at least we shall be "abreast of the times," such as they are. In any case it is well to remember that, just as out of the crash of opposing orthodoxies arose religious and intellectual freedom, so out of the clash of working hypotheses emerged, quite by accident, as a sort of side issue, the great truth that acquirements are not transmissible.

The animal body, in Mr. Herbert Spencer's opinion, is a sort of crystal. It is to be regarded as compounded essentially of "physiological units," of very highly complex, chemical compounds, not of cells, of unicellular animals. As the molecules of a crystal arrange themselves in an aggregate which has a particular shape—the shape of the crystal—so, he thinks, do the physiological units, of which an animal is compounded, arrange themselves in an aggregate which has a particular shape—the shape of the animal. Differences in animal shapes are by him accounted for by supposing that there is a slight difference in their physiological units, which in the aggregate produces considerable differences in shape. Thus a dog differs from a sheep, because of a difference in physiological units. A son resembles his father, because their physiological units are much alike; he differs somewhat from his father, because of a slight, a very slight, difference in physiological units. Physiological units, according to Mr. Spencer, are modifiable by all the forces that impinge on the aggregate—the animal. The germ, like the rest of the animal, is compounded of physiological units, and, like the rest of the animal, its units are modifiable by the play of forces to which the aggregate is subjected. Therefore, when the aggregate is modified by forces impinging on it, the germ is likewise modified; wherefore, when by the assimilation of food molecules, which in it are built up into physiological units similar to those composing it, growth occurs, it develops or crystallises into an organism. In this way is the transmissibility of acquired traits accounted for; and, in Mr. Spencer's opinion, to doubt that transmissibility is to doubt the "persistence of force."

But there are fatal objections to Mr. Spencer's speculations. It is impossible to admit that that form of force which causes, under fit conditions, the development of living organisms, is the same as that which causes, under fit conditions, the growth of crystals. Under fit conditions a crystal grows into a definite shape, according to its kind, and so does an organism; and there the analogy ends. Mr. Spencer, with more reason, might have compared an organism to a river, and reasoned from that basis. A river grows like a crystal and an organism, but, like an organism and unlike a crystal, waxes and wanes according to circumstances, is somewhat heterogeneous in composition, consists from time to time of new material, and so forth.

A crystal is essentially stable and homogeneous throughout, and if in a solution there are molecules of different kinds, capable of crystallisation, they crystallise separately into different kinds of crystals. "Our very definition of crystal structure is an arrangement of particles, the same about one point as about every other point; hence, in one sense, the smallest fragment of a crystal is complete in itself."[1]

An organism is essentially unstable and heterogeneous; the lowest organisms we are able to examine show, in their granular appearance, unmistakable evidence of heterogeneity; higher organisms are obviously heterogeneous; and, according to Mr. Spencer, the physiological units in them must, if they have any existence, be highly heterogeneous, since he speaks of the "specialised molecules of each organ,"[2] though here he does not explain by what process of crystallisation the molecules of a *crystal* are "specialised"; since he speaks of "countless different combinations of units derived from parents, and through them from ancestors immediate and remote,"[3] and since he speaks of "the mixed physiological units composing any organism, being, as we have seen (?), more or less segregated in the reproductive centres it throws off."[4] Here, again, it may be asked, by what process of crystallisation thousands and tens of thousands of heterogeneous physiological units come to be segregated in the germ? The force of crystallisation, as known to physicists, would tend to separate, not to segregate them.

"Crystals grow by the addition of regular layers of molecules, arranged just like all other layers. We can set no limit to the size of a crystal, so long as the supply of materials and conditions favourable to its formation remain constant. There is, in fact, the widest divergence in the size of crystal individuals of the same composition and structure. Those of ultra-microscopic dimensions, and those of many feet in length, may be identical in everything but size. Both are equally complete, and one is in no sense the embryo of the other. As a rule, the size of a crystal is inversely proportionate to its purity and perfection of form, but this, as will be seen at once, is dependent on external conditions. Finally, the individual crystal, unlike the individual organism, will remain unchanged, so long as its surroundings remain favourable to existence."[5]

But living organisms grow after an altogether different fashion; they do not grow by additions to their outer layers. Small crystals resemble large crystals of the same kind, in all except size; but embryos do not so resemble adults of the same species, they resemble more closely lower animals. The changes undergone by the embryo, explicable by the cell theory, but inexplicable by Mr. Spencer's theory, are alone sufficient to prove that the development of the organism is not a process of crystallisation.

Mr. Spencer says: "While an aggregate of physiological units continues to grow . . . no equilibrium can be arrived at between the whole and its parts,"[1] but as regards all crystals there is perfect equilibrium between the whole and its parts during every stage of growth.

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[1] Williams, "Elements of Crystallography," p. 10.

[2] "Principles of Biology," vol. i. p. 178.

[3] *Loc. cit.*, p. 268.

[4] *Loc. cit.*, p. 283.

[5] "Elements of Crystallography," pp. 10, 11.

The force of crystallisation binds the component parts of the mass perfectly together; never do crystals emit minute particles, to serve as germs of future crystals, but that force which causes the development of living organisms causes also those organisms in time to separate from themselves minute particles, the germs of future like organisms.

The stag at one season of the year, when he is frequently engaged in combats, carries large and massive horns; these are shed, so that at another season, when he is more peaceably inclined, he is without them, and thereby the shape of the animal, taken as a whole, is greatly modified. If the stag is a sort of crystal, under what law of crystallisation does this crystal modify itself periodically for the purpose of fighting? Are we to suppose that the stag's physiological units periodically undergo so great a change as implied in his great change of form?

Pages might be filled with similar objections to Mr. Spencer's theory, but it is needless to multiply them. His whole work is disfigured by that "scandalous vagueness" which Professor William James has so feelingly denounced. We may admit the persistence of force, but we cannot admit that the persistence of force influences heredity in the way he would have us believe. Above all, in the absence of evidence, we cannot admit the existence of physiological units.

Darwin, in striving to account for the fact that complex and heterogeneous multicellular organisms are able to reproduce their like by means of germ cells, supposed that each cell of the multicellular organism sends off portions, which he called gemmules, of itself, which gemmules, entering into the substance of the germ cell, so affect its constitution as to cause it, when fertilised, to proliferate into an organism like to that from which it was derived. Since Darwin held that acquired variations are transmissible, this, his theory of Pangenesis, must include the corollary, that when any part of the organism, for instance the arm muscles, varies in such a manner as to increase the number of its cells, the additional cells send off additional gemmules to each of the germ cells; whereas, if it varies in such a manner as to decrease the number of its cells, a number of gemmules, corresponding to the decrease, are in some way withdrawn from each of the germ cells.

Now the germ cells of many animals, as for instance of a man, are numbered by millions; the other cells, the somatic cells, by billions; and during every moment of time some of the somatic cells are perishing and others are proliferating. Therefore, to discover the number of gemmules sent off by the somatic cells of an organism to its germ cells, we must multiply the millions of the germ cells by the billions of the somatic cells, and then multiply the product by the moments of time, multiplied by the number of the separate acts of cell proliferation and death occurring during each moment of time. This consideration renders the whole theory incredible, and it is rendered almost unthinkable if we take into consideration also that each germ cell is a mere speck as compared to the rest of the body; that the blood, a fluid mass of considerable volume, must accurately bring from every part of the body to each of these specks its appropriate billions of gemmules; and that, when arrived, each gemmule must take up its proper position in the germ cell, so as to cause it, when fertilised, to develop into an organism similar to that of which it (the germ cell) forms an infinitesimal part. It is hard to believe that such a theory can ever have been seriously entertained by biologists of note, and that, notwithstanding the fact that it is wholly inapplicable to plants, the nutrient fluids of which flow generally in one direction and do not circulate in the sense that the nutrient fluids of animals circulate. But the most wonderful thing about the theory is, that Darwin should have been its author—Darwin who spent a long and strenuous life in the patient accumulation of evidence, and who on evidence, and evidence alone, founded his splendid work.

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[1] "Elements of Biology," p. 288.

Spencer's theory, I think, was never accepted by any considerable body of biologists. Darwin's theory also faded very quickly into the background. But twenty years or so ago another theory, Weismann's, came to the forefront, and has held the field ever since. It is not easy to give a connected account of it. The philosopher's language is remarkable for its obscurity, and times and again he has amended his theory under the fire of hostile criticism. To begin with, Weismann thought there was germ plasm, a very obvious supposition. He thought it resided in the germ cell, another obvious conclusion. Next, he thought it resided in the nucleus of the germ cell, which is probably true. Thereafter, he plunged into the regions of the unproved and the unprovable, the unknown and the unknowable. He thought that the germ plasm of any individual was compounded—(1) of the discrete germ plasms of his ancestors or some of them, and (2) of the germ plasm of the various tissues, bone, muscle, nerve, blood, gland, etc. Into these latter the germ plasm separated during the development of the individual. But all the germ plasm of the germ cell was not thus used up during the development of the individual. Some of the plasm derived from various ancestors was got rid of when the polar bodies were extruded.[1] Of the rest a portion was reserved more or less unchanged. The latter grew in volume by nourishment, and went to form germ cells, whence sprang new individuals, *i.e.* offspring. There was thus a continuity of germ plasm. By this means did the individual reproduce his like. Thus did a dog produce another dog, a cat another cat. In fact, offspring and parent sprang from different portions of almost the same germ plasm. Obviously, according to this theory, acquired characters could not be transmitted, since that portion of the germ plasm which was separated off from the rest, and went to form the soma of an individual, played no part in the reproduction of his offspring. Reproduction was managed by the more or less unchanged germ plasm which passed into the germ cells.

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[1] Just as a family possessing limited wall space, but a great number of pictures of deceased ancestors, might provide space for the newer pictures by getting rid of the older ones.

It was objected that other cells besides germ cells could reproduce whole individuals. A fragment of begonia leaf, for instance, can reproduce the whole plant. Weismann met the objection by supposing that some of the unchanged germ plasm passed into various tissues. Other objections were raised. Thereupon, by way of proof, he invented all kinds of theories and all sorts of plasms. An apt illustration of his theory may be found in any army. An army is divided into army corps; army corps into divisions; divisions into brigades; brigades into regiments; and so forth, and so forth.

It must be admitted that Professor Weismann's doctrine cannot be controverted any more than a doctrine of civilisation in Mars can be controverted. The more unreal a theory, the less it is founded on verifiable evidence, the more difficult it is to furnish evidence in negation. Who can controvert the theory of lunar cheese? It is possible that Weismann's theory is correct, but, in the total absence of evidence, it is probable that it is very much the reverse. Or, at least, while it is possible or even probable that there is a continuity of the germ plasm, it is wildly improbable that the germ plasm is compounded of ancestral plasms and of ids, idants, biophors, and the rest of the elaborate web of guesswork. Consider our absolute lack of data, and the profound obscurity, the immense complexity of the problem!

It is common in medical writings to meet such phrases as "even Weismann admits" this or that. It is assumed that the doctrine of the non-transmission of acquirements depends on his theory of the continuity of the germ plasm. We have seen that, as a fact, it depends on quite other considerations. In the numerous and very dreary works published by biologists, emphasis is hardly ever placed on the fact that the multicellular organism springs from a single cell. The student may wade through whole volumes and get no hint of it. Nevertheless, it is this fact that is the corner-stone of the doctrine. For if it be true that the multicellular body is formed by the division, and the many times repeated redivision, of the fertilised ovum; and if it be true, also, that the cells of the soma do not conjugate with the germs, then it is plain that they can play no part in heredity, and as a consequence that acquired traits cannot be transmitted. In that case, in formulating a theory of heredity, we must ignore all the other coexisting cells of the body, and concentrate our attention on the germ cells, and on the unmixed lines of ancestor cells which intervene between them and the fertilised ovum, whence sprang the body which contains them.[1] To adopt a somewhat imperfect illustration, we must concentrate our attention on the line of queen bees, and ignore the attendant swarms of workers. From the point of view of heredity, the soma is nothing more than a protecting envelope thrown out round the germ cells and their immediate ancestors, just as the worker swarms are in a sense protective envelopes thrown out round the queen bees. Successive individuals are merely incidents in the career of the germs. They are (from the point of view of heredity) of importance only as showing the kinds of envelopes the different species of germs surround their descendants with—the human germ cell surrounding its descendant germs with a human body, the canine germ cell surrounding its descendant germs with a canine body.

The working hypotheses of biologists, as a rule, ignore this simple conception of heredity. Darwin derived the germ cell from all the other cells of the body. Spencer ignores cells altogether. He treats the body as a unity, a surprising crystal which differs in all essentials from every other kind of crystal. Weismann approximates nearer to the truth, in that he insists on unmixed lines of descent for the germ cells. But when he speaks of the extrusion of the germ plasms of ancestors in the polar bodies, he reveals that he is still under the tyranny of the "individual." He shows that his conception of the continuity of the germ plasm is very imperfect, since he thinks that the germ plasm of one ancestor is sharply marked from the germ plasm of any other ancestor, in that it can be separately extruded. There is most probably a continuity of the slowly changing germ plasm, but Weismann's theory, its name notwithstanding, implies a negation of continuity.

Other theories, the authors of which would no doubt insist strongly on continuity, plainly imply a similar breach of it. Galton's theory of inheritance is an example. He likewise gives fatal prominence to the "individual." His theory, which has been termed "the most important conclusion which has yet been reached in regard to inheritance," supposes that one-quarter of the total inheritance of the individual is derived from each parent, one-eighth from each grandparent, one-sixteenth from each great-grandparent, and so forth. We have seen that the test of a theory of heredity lies in its ability to explain the facts of evolution. Now a theory of evolution which involves Weismann's and Galton's hypothesis, of a germ plasm compounded of separate germ plasms from separate ancestors, is not only in conflict with a vast mass of evidence derived from the facts of evolution, but is in direct conflict with a conception of evolution which is probably held by every biologist, including Galton and Weismann themselves.

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[1] It may be said that this is Weismann's theory. It is—with the important exception of the guesses.

Imagine the primitive world, in which only unicellular organisms were present. Suppose that variations occurred amongst these, just, as we know, they occur higher in the scale. Then we may well believe that such variations as the following occurred: that, when one cell divided into two, the resulting cells did not separate, as normally happened, but remained adherent. This variation, which, like other variations, would tend to be transmitted, and which, if fortunate, would tend to cause the ultimate survival of the organisms which possessed it, would be the first step in the evolution of the multicellular from the unicellular organism. The dual animal which resulted would reproduce by each of its cells dividing into two, so that there would be four single cells, which would separate so as again to form unicellular organisms. But each unicellular organism would, in general, inherit the peculiarities and repeat the life-histories of its grandparent cells by dividing into two adherent cells. A race of two-celled organisms would thus be established. We may fairly believe that in time a second variation, which also proved fortunate, occurred, whereby the four granddaughter cells also remained adherent until reproduction, and afterwards other variations of the like nature, till at length an organism was evolved which consisted of a multitude of cells adherent for the common benefit. When this organism reproduced, it would be by one or more of its cells separating and dividing into two adherent cells, these into four, and so on, till the parent organisms were represented. The development of the individual would thus necessarily recapitulate the life-history of the race. This rule would still obtain when evolution proceeded farther, and cells had become differentiated and specialised for the performance of different functions. Every individual would still begin as a single cell, the germ; and then, step by step, would represent ancestor after ancestor, till at last he represented the last of the race, the parent.

The above view of evolution is forced on us. There is no conceivable alternative, as I think the reader will find if he tries to think of one. It squares perfectly with the facts of embryology. Every multicellular individual passes through the one-celled, the two-celled, the four-celled, and the succeeding stages of evolution. His development is a very rapid and, on that account, a very dim and blurred recapitulation of the life-history of his race. His ancestors, therefore, are not represented in the lump (presumably in the adult individual), but in orderly succession, beginning with the first and ending with the last. Weismann's and Galton's hypothesis of a germ plasm, compounded of separate ancestral germ plasms, is patently impossible with the evidence.

With the exception of the firm establishment of the great truth that acquirements are not transmissible, the doctrine of evolution remains very much as Darwin left it. Founding himself on evidence, he sketched a map. Little has since been done to fill in the details. His successors, ignoring evidence, have employed the unscientific imagination in the pursuit of will-o'-the-wisps. When good work founded on evidence—really splendid work in the case of the Penicuik experiments — has been done, it has attracted comparatively little attention. Probably the root of the evil lies in the fact that the scientific students of heredity and evolution are, and have been, very few in number. All sorts of fads and fancies are apt to spring up in a narrow circle. The study has been undertaken almost exclusively by zoologists and botanists, a limited class, who in addition, like most other people, are usually observers and compilers rather than reasoners. It has been the great misfortune of the science that the largest class of biologists, the best equipped for the study, medical men, have held aloof. But medical abstention is rapidly becoming impossible, or at any rate discreditable. I use an odious word advisedly. Here we have a branch of physiology, an all-important branch, which concerns medical men most intimately. The problems that arise from it have stirred civilised peoples to their depths. It has been the principal theme of scientific thought for half a century. Recognising its importance, the acutest intellects in the world have devoted their lives to its elucidation. A definite conclusion has been reached to which the great majority of thinkers subscribe.[1] Yet to this day, no systematic instruction in heredity is given to medical students, and most medical men are strong upholders of an incredible and long-exploded doctrine. Surely it is not fitting that medical men who constantly write and speak on this question of physiology should yet, as a body, be ignorant of all that is scientifically known about it—that they should write and speak as scientific men on a scientific subject intimately connected with their work, and yet know nothing about it in all its scientific bearings.

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[1] I shall doubtless be told that many or at least several eminent thinkers still believe in the transmission of acquirements. The question cannot be settled by the counting of eminent heads, but if the enumeration of heads were of importance, probably ten eminent heads could be counted as against the Lamarckian doctrine for one in favour of it. It is sometimes said that the question is still *sub judice*: that as yet neither party of disputants has proved its case. A curious view of logic is involved in this assertion; apparently it is expected that Neo-Darwinians shall prove a negative. Of course it is impossible, and always will be impossible, to *prove* that acquired characters are *not* transmitted. We can only declare that the Lamarckian doctrine is seemingly incredible, and undertake to shatter any evidence brought in support of it. Trillions of living beings exist in the world; some of them acquire thousands of traits; hundreds of men for a score of years have delved in this mine of evidence, seeking to prove the transmission of acquirements, and have failed to demonstrate it in even a single instance. Surely it is enough.

The usual excuse is that physicians and surgeons ought to be "practical" men, and that heredity is not a "practical" subject. But that medicine has its scientific as well as its practical side, that it is something more than a mere collection of tips—Ipecac. is good for cough, chlorodyne is good for stomach-ache, and so forth—has been freely recognised for generations. Medical students are taught, and rightly, much that can be of no practical value. I do not know, for instance, that any surgeon has ever benefited by his knowledge of ever so many layers in the soft palate, or I forget how many spinal muscles. No physician, as such, is the better for numerous recondite facts of physiology—Dobie's line, Huxley's layer, and the like. It is incredible that an intimate acquaintance with the bones of the cod's head or of the subdivisions of the *Rosaceæ* can help the practising doctor. Our students are crammed with facts, which, though useful for educational purposes, are, except in rare cases, soon disgorged by the surfeited memory. I suppose that I am much as other men. At the present time I have no very accurate idea of the exact composition of bile or of urine; I am not sure of the attachments of a single muscle, nor can I tell offhand the branches or the relations of a single blood vessel or nerve. All that remains to me of the huge mass of facts with which I faced the examiners are certain general notions, which, however, owing to my training, can quickly and easily be converted into precise knowledge by a glance at those artificial memories, my books of reference. Redundant facts, then, are taught to our students in abundance, even facts that can by no possibility have a practical value. The argument that heredity has no practical bearing would therefore be invalid, even were it true. But it is very far from true. Take, for instance, the case of tuberculosis.

Every race is resistant to every lethal disease, strictly in proportion to the extent to which it has been afflicted by that disease in the past. Thus, negroes, who have been more afflicted by malaria than Europeans, have now much greater resisting powers against that disease than the latter. Tuberculosis is another case in point. Essentially a disease of crowded populations, it has afflicted the more densely peopled areas of the Old World with ever-increasing severity since prehistoric times. The unfit, the weak against it, have thus been weeded out, till the people of Western Europe and Eastern Asia have so far undergone evolution, that to-day they are able to dwell in cities and towns under conditions which would have been impossible to their remote ancestors, and which are impossible to the inhabitants of the New World, where tuberculosis was unknown till introduced by European colonists.

Nature's method, if I may so term it, of sanitation, of protecting against lethal disease, is therefore to increase the resisting power of the race afflicted. This she does in two ways. Either she evolves inborn immunity, when the individuals of the race afflicted become, during the lapse of generations, more and more capable of *resisting* infection; or she evolves a power of acquiring immunity, when the members of the race afflicted become more and more capable of *recovering from* infection. Tuberculosis and measles furnish cases in point. Immunity cannot be acquired by the individual against tuberculosis, that is, one attack of tuberculosis does not confer increased resisting power on the individual. If anything it weakens him; and therefore tuberculosis, by weeding out the unfit, those who could not *resist* infection, has resulted in rendering the race more and more resistant to infection. Thus, as I say, Englishmen who have long been afflicted by tuberculosis are now, under similar conditions, much less liable to contract the disease than Polynesians. On the other hand, one attack of measles does confer greatly increased resisting power against subsequent attacks. Nearly every one takes measles, and most people recover from it. The unfit in this case are in general those who cannot personally acquire immunity. As a consequence, the British, who have long been afflicted by measles, though they take it as easily, yet recover from it much more readily than the Polynesians, who have had little or no experience of the complaint.

Man has added to nature's sanitary method a device of his own. He endeavours to destroy the microbes of disease. His plan, like nature's, is twofold. On the one hand, he strives to procure the destruction of the microbes by eliminating their food supply, *i.e.* by making every one artificially immune. This plan has been very successful against smallpox, and promises to be successful against other diseases, but obviously it can only succeed against such diseases as permit the acquirement of immunity by the individual. Against such diseases as tuberculosis and leprosy, where the individual cannot acquire immunity, it is useless. On the other hand, man endeavours to destroy the microbes by more direct methods, by what we ordinarily mean when we speak of sanitation. These direct methods have been more or less successful against certain water-borne diseases (*e.g.* enteric fever and cholera), less successful against earth-borne diseases (*e.g.* tuberculosis), and quite unsuccessful against air-borne diseases (*e.g.* measles and chicken-pox), which are as common as ever.[1]

We have now to note three points:—(1) Some races of men have evolved from a condition of great susceptibility to phthisis to one of comparative insusceptibility. (2) Every race which has undergone any kind of evolution tends, when the eliminating agency which caused the evolution is withdrawn, to revert to the ancestral condition which obtained before the evolution occurred.[1] (3) Those races of mankind which have undergone no evolution against tuberculosis are quite incapable of persistence, under conditions so favourable to the spread of the disease as obtained under modern civilisation. Their death-rate rises so high that they undergo extinction, not evolution, as has been the case throughout vast areas of the New World. Here, for instance, is a case culled from an enormous field:—

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[1] Man has a third method: he endeavours by isolating infected individuals to remove the microbes from future food supplies; a very ineffectual method, as a rule.

"The tribe of Haapa is said to have numbered some four hundred, when the smallpox came and reduced them one-fourth. Six months later, a woman developed tuberculous consumption; the disease spread like fire about the valley, and in less than a year two survivors, a man and a woman, fled from the newly created solitude. . . . Early in the year of my visit, for example, or late the year before, a first case of phthisis appeared in a household of seventeen persons, and by the month of August, when the tale was told me, one soul survived, and that was a boy who had been absent at his schooling."[2]

Whenever modern sanitary measures against tuberculosis are successful, a number of comparatively susceptible people survive, who would otherwise have perished. Their influence is felt in the next generation, in which the number of susceptible people is thereby increased. Were sanitation against the tubercle bacillus perfect, were the organism entirely banished, it is evident that the race would revert to that original condition, when it was so highly susceptible to tuberculosis as to be as incapable of persisting under the present conditions of civilisation as modern Polynesians are. Of late years, sanitary measures against tuberculosis have been fairly successful. The death-rate has fallen. But it is evident that, unless we continue to improve our methods of sanitation, the death-rate will not fall in the next generation; on the contrary, owing to the increased numbers of susceptible persons it will tend to rise. The question that arises then is this: Can we reasonably hope to so greatly improve our methods in the future as to procure the ultimate banishment, the entire extinction, of the *B. tuberculosis?* or, at least, can we hope to bring about conditions better than those which prevail at present on almost any part of the habitable globe? The natives of Polynesia and North America, who have undergone no evolution against tuberculosis, are perishing under conditions in which the most susceptible Englishmen rarely take the disease. During a stay of five years in a rural district of New Zealand, I never saw a case of tuberculosis among the colonists, but the disease had exterminated the natives. We have only to introduce modern civilisation—clothes, schools, churches, etc.—to any South Sea island, to secure the extinction of its inhabitants at no very distant date. More than one phthisical British missionary, sent for his health's sake to a sun-bathed and wind-swept Pacific island, has found occasion to admire the rulings of Providence, which restored his own health just when his congregation, mysteriously smitten (*i.e.* infected by him), most needed his ministrations. It is plain, therefore, that unless we are able to eliminate the *B. tuberculosis* our sanitary measures can only be temporarily successful. The success of one generation will be visited on the head of the next.

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[1] Thus garden plants tend to revert to the wild type; prize breeds of animals to ordinary stock. *Vide* "Alcoholism," Appendix E, London, 1901.

[2] "In the South Seas," p. 27, Robert Louis Stevenson.

Of course this is no argument against sanitation. A future generation, with improved sanitation, will be no worse off than we are at present. If the sanitation is not progressive nature will redress the balance. It is only a statement of fact. But it is a fact that forces on our consideration the question I have asked above. Is it or will it ever be possible to exterminate the *B. tuberculosis?* I think only a very sanguine man would answer in the affirmative, or even assert that, in a world that is daily becoming more crowded, conditions so good as those which prevail in the rural districts of the colonies, and under which the natives perish, will ever be reproduced in our cities and towns.

It must be remembered that sanitation against the disease is domestic rather than communal. It has to be carried out by the individual rather than by the State. The State may perhaps insist on a certain type of dwellings. It cannot be so paternal as altogether to control the habits of the dwellers, as regards cleanliness, ventilation, and light. Above all, it cannot force phthisical patients, in public and private, in waking and sleeping, to hold, when coughing, handkerchiefs saturated with antiseptics over their mouths—particularly as phthisis is not always diagnosable in its earliest stages. The example of leprosy, a disease infinitely less communicable than phthisis, affords us little hope. Ruthless segregation alone procured its disappearance. But segregation is impracticable against phthisis, not only because its cruelty renders it adverse to our modern spirit, but because the vast army of consumptives is too unwieldy to be thus dealt with. Sanatoria are the nearest approach to segregation that has been attempted or suggested, but, as a matter of fact, their object is to cure, not to segregate. They are useful only to more or less indigent sufferers, who are placed within them under conditions superior to those obtainable in their own homes. Even then they are useful only to such sufferers as nature and evolution have placed on the border line; who in good health and under good conditions are immune to phthisis, but who in worse health and conditions fall victims. At best, the cases cured in these institutions return to breed, in the very homes where they contracted the disease, children as susceptible as themselves to infection.

It seems improbable, therefore, that tuberculosis will ever be abolished or even greatly reduced, except we adopt nature's method of sanitation instead of or in addition to our own—unless by some means, less cruel than those adopted by nature, we can contrive to reduce the output of children predisposed to phthisis. Of course it is open to objection that such a method is impracticable; but that is a matter for future and no doubt differently educated public opinion, lay and professional, to decide. Or, again, it may be objected that our duty is only to cure present disease, and that we have no concern with future generations. No doubt, under the "cough and stomach-ache" theory of medicine, this opinion may be held. Certainly, the more the coughs and stomach-aches the greater our professional usefulness; the greater the amount of phthisis in the future, the greater will be the activity of our professional descendants.

"Practical" theories of medicine furnish no remedy in the case of the disease of alcoholism, which is probably the cause of a far greater number of deaths than phthisis or any other disease. All medicinal means that have been devised are nothing more than palliatives in the various morbid conditions produced by excessive drinking—and very poor palliatives, at that. We cannot, by medicines, cure a man of a craving for strong drink. All sanitary (*i.e.* preventive) measures have proved useless. We cannot lock up or otherwise segregate the enormous army of drunkards. Moral teaching and actual prohibition have been found equally vain during the thousands of years in which they have been tried. In the modern civilised world, prohibition, indeed, by driving the drink traffic into secret and disreputable channels, produces a great and immediate outburst of drunkenness. This statement may appear paradoxical, but a study of the literature of the subject readily and fully demonstrates its truth.[1]

The popular theory is that men are drunken or sober accordingly as they do, or do not, exercise self-control. The real fact is that, *generally speaking*, men are drunken accordingly as they do, or do not, enjoy drunkenness. Most men are temperate, not because they exercise restraint, but because they lack temptation. The reader may test the truth of this by a little introspection. He is probably a moderate drinker, in which case it is a thousand to one that he is not continually tormented by a craving for drunkenness, which he strenuously resists; in other words, it is a thousand to one that he is sober because of his inclinations, not in spite of them. It does not enter into the minds of most people, that the drunkard may ardently struggle against his craving, and fail, whereas the moderate man may exercise absolutely no self-control, since, having no drink crave, he has nothing to control. Evidently, therefore, just as men differ in every other peculiarity, so they differ with respect to the depth of the craving experience of alcohol awakens in them. Now, it is only reasonable to suppose that, *as a rule*, men drink in proportion to their desires. Alcohol is a poison, and the cause of a large death-rate. Again, it is only reasonable to suppose that it poisons to the greatest extent those who indulge in the greatest degree. It thus eliminates immense numbers of people of a particular type, and has done so for ages.[1]

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[1] *Vide* "The Temperance Problem," Rowntree and Sherwell.

Anciently all races were drunken. Thus history tells of the drunkenness of the ancient Jews, Greeks, Italians, Germans, Spaniards, etc. To-day many races are temperate—*e.g.* Jews, Greeks, Italians, etc. In every instance a race which is now temperate has had a long and disastrous experience of alcohol. Some savages, *e.g.* West Africans, are temperate,[2] but they likewise have had a prolonged experience of alcohol. Most savages have had no experience of alcohol, or have been able to manufacture alcohol only in solutions so dilute as to be practically harmless. When able to obtain strong modern solutions, they are so drunken that they perish. Alcohol renders them as incapable of enduring the stringent conditions of civilised life, as phthisis renders Polynesians. Between the two extreme types of drinkers, the South Europeans and most savages, lie all the other peoples of the earth —Anglo-Saxons, Scandinavians, Russians, etc. In each instance the race is temperate strictly in proportion to its past experience of alcohol.

The wit of man has failed to devise means for making and keeping people sober. Temperance reform has been tried and failed in scores of countries, on hundreds of occasions during thousands of years. It is not probable, after this vast series of experiments, that we can now devise new and successful measures, so long as we work on ancient and orthodox lines. But nature has been everywhere successful. By copying nature, by procuring the elimination of the "alcoholic diathesis" by means more rapid but less cruel than those adopted by her, man may also be successful. No doubt this suggestion, like that I have just made with reference to phthisis, will be declared impracticable. Very probably it is impracticable. At any rate the subject is too big for discussion here. I have only to say that, if it is impracticable, then since all other measures have proved not only impracticable but actual aggravations of the evil, we have no alternative but to fold helpless hands, and abide in the pious hope and expectation that our descendants will reap some benefit from our sufferings.

However, the purpose of this article is not to advocate any particular applications of heredity. I have striven merely to show that heredity has a practical value; or, at any rate, that it has important bearing on some practical questions of undeniable importance. It is not even necessary to dwell on the vast influence heredity in relation to disease has had on the fate of races and nations. The natural history of the human race is emphatically a medical subject, but it was sufficiently dealt with in a former article.[1] The main purpose of the present paper is to demonstrate, not the practical, but the educational value of the science.

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[1] The effect on death-rate begins quite early in life, as is proved by the statistics of friendly societies.

[2] *Vide* "Travels in West Africa," by Mary H. Kingsley, pp. 492, 495; "Nine years at the Gold Coast," by the Rev. Dennis Kemp, pp. 169, 172. Cf. also "The Siege of Kumassi," by Lady Hodgson.

Every course in the medical curriculum is designed almost solely to supply the student with information. But no course is especially designed to make him think, to develop habits of close and accurate reasoning. No doubt all teachers strive to remedy the deficiency, and many succeed to a great extent.[2] But all teachers are greatly handicapped by their subjects. The wealth of facts is so great, and their time so scanty, that in the interests of their students, they must limit themselves mainly to the inculcation of facts. On the other hand, the facts of heredity are comparatively speaking very few; or rather, the facts necessary for the study of heredity outside of, and in addition to, those supplied to the student, during the ordinary course of his labours, are very few. What heredity specially supplies the student with, is a mass of *marshalled* evidence; what it particularly demands from him is the closest attention to a long chain of accurate reasoning. Without this careful marshalling of evidence, this accurate reasoning from evidence, and evidence alone, the study of the science is naught. It is a mere waste of valuable time, a disastrous indulgence in pernicious habits of thought, as eminent biologists labouring to found working hypotheses have demonstrated times without number. Properly conducted, that is conducted with the declared intention of reasoning from evidence alone, such a class should be an ideal one for the purpose in hand. No student could hope to pass muster before his teacher, unless he assimilated the chain of reasoning; no teacher could hope to appear with credit before his students, unless he founded himself wholly on authenticated fact.

It goes without saying that this class, to be successful, would have to draw its students from men who were nearing the termination of their studies, preferably men in the final year. The subject places under contribution for its facts almost the whole range of studies within the medical curriculum — zoology, botany, comparative anatomy, physiology, pathology, medicine, surgery. It could therefore be dealt with only in a special course. In the early courses of the curriculum, the students have not the necessary knowledge; in the later courses, the teachers have not the necessary time.

That heredity will be taught to all medical students at no very distant date is certain. As a division of physiology it is naturally a part of their studies; and it is altogether too big and important a part to be ignored even by the most conservative of teaching bodies. The excuse that it consists chiefly of vague philosophy is no longer available, for out of the deluge of working hypotheses enough solid truth has emerged to justify its erection into a science. It will be interesting to note the teaching body that will first include it in the curriculum. Whatever happens, that body has not its home in England, where new things find little favour, and the mere mention of heredity arouses the wrath of the dominant "practical" school. It has not its home in France or Scandinavia, where the principal exponents of heredity are novelists and poets, who deal with it according to the best traditions of fiction. Nor is it in Russia or Austria, where science is apt to come into conflict with the prevailing orthodoxies, and get the worst of the encounter. It is not in America, where scientific men are still wedded to the fallacy of the transmission of acquirements, and where, consequently, the science is in too nebulous a condition for profitable handling. It is either in Germany or Scotland. As a graduate of the University of Edinburgh, it is my earnest hope that it is in the latter, and that, of all the Scottish schools, my own will take the precedence.

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[1] Vide *Scottish Medical and Surgical Journal*, June 1900.

[2] Mr. Joseph Bell is a celebrated example.

For half a century, now, heredity with its collateral science of evolution has dominated the thought of the civilised world. Many other controversies, fierce enough in their time, have raged, but to-day they all seem faint and forgotten, beside the vast issues raised by this newest of sciences. But however big the issues, and however notable the controversies of the immediate past, they are probably but an earnest of what is to follow in the immediate future. When all is said and done, heredity lies at the root of every important medical and social question. And the university, or other teaching school, that first trains and sends at forth a large body of medical thinkers conversant with its problems must infallibly become the leading intellectual centre of the world.

ATONY OF THE UTERUS AS A CAUSE OF EXTERNAL HÆMORRHAGE DURING UTERO-GESTATION.

By James Oliver, M.D., F.R.S., F.L.S., *Physician to the Hospital for Women, London.*

In the human female, under ordinary circumstances, as the evolutionary changes taking place in an ovum, in consequence of fertilisation, proceed uninterruptedly to maturity, the menstrual discharge is held in abeyance, *i.e.*, during a period of about 274 days. Impregnation, it is remarked, does not take place because the menstrual discharge has failed to reappear at the wonted time, but menstruation is arrested because fecundation has occurred. It may be arrested before the developing ovum reaches the uterus, and it may even be held in abeyance during a period of nine or more months, whilst the product of conception attains maturity outside this organ; consequently the amenorrhœa is quite independent of the presence of the ovum in the cavity of the uterus itself. Our knowledge is still so imperfect, that we are unable to affirm whether the ovum which has received a spermatozoon should have been extruded at the menstrual period preceding the occurrence of amenorrhœa, or would have been shed at that period which marks the beginning of this physiological phenomenon. In spite, nevertheless, of this enigmatical position, we are expected to be able to fix the date of parturition for any pregnant woman, and in any given case we are taught to reckon the stage of pregnancy from the date of the cessation of the last menstruation. This undoubtedly is a weak point in some of those theories which have been advanced regarding the agencies which determine sex, since it has been alleged that the ovum fecundated immediately before an expected menstrual period will produce a female, and that fecundated soon after a menstrual period will develop a male, or *vice versâ*, according as the authority believes in the potency of influences of a nutritive character to produce a female or a male If this tenet were admissible, it is evident that, according to our present method of calculation, the duration of gestation for a female would be decidedly either longer or shorter than that for a male, but in this direction we receive no support from experience.

Immediately fecundation is effected, the vascular activity of the uterus generally becomes augmented, but at about the sixth week of pregnancy, and in response to the irritative influence of those chorionic villi which are destined to participate in the formation of the placenta, the vessels over a localised area of the mucous lining of the uterus increase somewhat rapidly in size, and eventually form sinuses. This increase in size is attained at the expense of the wall of the vessel itself, which gradually becomes more and more attenuated, but in virtue of that vital support which these maternal vessels should receive from the opposing chorionic villi, this thinning process should not transcend a certain degree, and should be arrested before the blood pressure is capable of producing deleterious effects. If from any cause the coaptation between the chorionic villi and the uterine wall becomes impaired, then rupture of the maternal vessels may result, and hæmorrhage of a more or less severe character may ensue. In this way hæmorrhage is apt to be induced in consequence of atony of the uterus, and as the atony tends to interfere with the implantation of the chorionic villi at the very outset, hæmorrhage from this cause is commonly noted as early as the fifth or sixth weeks of pregnancy. Up to about the sixth week of pregnancy the ovum is covered with chorionic villi, which practically are of a uniform size, but about this period the villi which are of no further use begin to atrophy, whilst those destined to form placenta begin to hypertrophy, and continue to do so until about the tenth week. In virtue of their irritability, the placental villi endeavour to insinuate themselves into the uterine mucosa, which has already become prepared for their reception. In this process, however, the tone of the uterus must be such as to oppose in a measure the intrusion of these fœtal structures, otherwise coaptation is with difficulty effected, and the maternal sinuses failing to receive that support which is necessary for the maintenance of their integrity, may rupture spontaneously or on the slightest provocation. Hence it is that hæmorrhage in consequence of atony of the uterus is most commonly noted at about the sixth week, when the maternal vessels are developing into sinuses and the chorionic villi are endeavouring to plant themselves in the uterine substance. Occasionally we witness rupture of vessels in other parts of the body from a like cause, especially where there is more or less varicosity of the veins.

REPORT OF SUCCESSES IN THE TREATMENT OF FLOATING KIDNEY BY A NEW METHOD.

By J. ROSS WATT, M.B., C.M., *Consulting Surgeon, Ayr County Hospital.*

THE management of the above-named distressing displacement is still disputed and unsatisfactory, and as treatment without operative means is much desired by the majority, I desire to record the result of eighteen cases which have been treated by me during the last three years with most satisfactory results, without rest, massage, or exercises of any kind, and therefore without operation, immediate freedom being given the patient to walk about and take up active duties, which had, in some at least, been avoided from inability or resulting distress.

All were ladies of varying positions, ages, and histories, suffering from the usual complex symptoms accompanying and resulting from this displacement, mainly dragging pains, sick uneasy feelings following exertion, colicky pains, bilious vomitings, changed, dull, depressed expression, emaciation; in some, frequently severe recurring regular gastric crises, in two of the nature of alarming collapse with hepatic colic from no apparent cause; headaches, and other general disturbances of nervous system; and unaccompanied in all but two or three by knowledge of any existing displacement of the organ in question.

My method of treatment contrasts with the rest cure, with its rest in bed, massage, pads, and bandage, etc., and also with that of operation, in being much easier for patient and physician, shorter and pleasanter, calling in the natural aid of open-air exercise, and resulting in increase of weight, firmness of muscle, markedly those of abdomen, and return to a state of good health.

This method of treatment, based on supporting the *whole* abdomen, is obtained by applying two wing-shaped pieces of sheet-lead, as used by plumbers, five pounds to the square foot, to nearly meet in the middle line under good long fitting corsets, so as to cover all the muscular area bounded by the various bony curves and elevations. The shape first cut, *in situ*, in brown paper to each side very carefully, so that no natural prominence is within half an inch of the edge; this is a matter of some difficulty, and care at first will give less trouble afterwards. A workman exactly cuts the leads from the shapes thus taken, which are tightly covered with "holland" or "chamois," the former preferable, as the latter stretches too easily, a border of half an inch all round being left to allow of its being stitched inside corsets. To fit these leads to the figure, lay them on the abdomen over the chemise, curve them by hand pressure, apply corsets with patient lying on back, fasten corsets now completely, and with strong safety pins attach corners and edges to available points of support; now carefully remove corsets, and have leads sewn exactly in position; this should secure comfortable fitting, which is all-important.

To best apply this support while the person lies in bed, manipulate the floating kidney into its normal position, or as nearly so as possible, fix on these corsets immediately and fasten them; on rising, the comfort and firmness of the support is remarked by the patient. My experience shows that straight-fronted corsets are the best, as they retain the leads best in contact with the figure, and it is a necessary part of the treatment that the support be adjusted as well as removed *when lying down*, so that fixture of the organ may be more certainly obtained. Within a few minutes the pliable metal adapts itself to the curves and muscular divisions of the abdomen as the body assumes the different positions in sitting, rising, etc., so that when the corsets are removed at night, *after lying down*, the curves in the metal remain, showing the contour of the abdomen, and they should be gently handled and laid aside, so as not to change the acquired shape. Now, although the lead is usually about 3 lb., uncomfortable weight is seldom complained of, from its being spread over so large a surface, and, if quite clear of the bony prominences, support is conveyed to the internal viscera; and this so steadies the floating organ in its position as ultimately to fix it, to demonstration, in the majority of cases in three or four months. A few new leads will be required during the period of treatment, as the metal cracks at parts. I am convinced, from my success, that early application of this method will, if carefully tried, give results not hitherto obtained by any other.

The following reports of cases show my experience of it so far; and I invite the profession to try it in this distressing displacement, so troublesome and disappointing to treat:—

Case 1.—Mrs. F.—Severe hunting accident; horse falling in ditch, rolled over her; with difficulty relieved from position face downwards; back much bruised by saddle; in bed two weeks; kidney displaced and painful; carefully bandaged, with pad retained in position by broad strips of plaster; weeks of pain, sleeplessness, and general nervous disturbances. Confinement to sofa gave no relief; in three months no progress made; loss of weight, 23 lb.; kidney freely movable down to umbilicus. Consultation with eminent city surgeon only resulted in continuance of treatment by bandage. I determined to try the idea of extensive abdominal support, and fixed upon lead as most promising. Applied as above described gave happy result. Patient took short walks, gradually extended to five miles on the twelfth day; in six weeks could go anywhere and do anything short of saddle and cycle exercise; in eight months rode again to hounds; weight up to normal; kidney felt *fixed* in nearly normal position; recovery rapid, owing to plentiful effusion aiding fixture. At present date patient is strong, having hunted and worn no support during three consecutive seasons following accident.

Case 2.—Also an accident.—Miss A., two months previous, pitched out of two-wheeler over steep bank; similar nervous distress to Case 1. When consulted, kidney very loose; support worn two months; result, fixture and health; three years after, kidney found fixed in normal position; rapid recovery for same reason as that above. The two following cases show different symptoms entirely.

Case 3.—Mrs. B. strained side in reaching up to work two years ago. Ill every week or two with recurring severe pain in right side, accompanied by bilious vomiting, prolonged for hours; hepatic collapse; kidney discovered rolling about; fitted with support, worn four months; no return of attacks. Two years after, examined kidney; fixed, and health established.

Case 4.—Miss D.; long in business; much standing; health bad, one day every week being spent in bed; bilious vomiting, extreme headache. Here at first (as in some other cases), uncertainty as to looseness of kidney, but, after all medicine failed to relieve, repeated examination pointed to kidney being at fault; support applied; periodic illness left, no headache for five weeks; bright, active, and convinced she is relieved. Support still being worn now for twelve weeks.

Case 5.—Miss K., governess; low depressed health for some months; weak and emaciated; right kidney found free in abdomen; fitted with case, worn two months; after which, as health and weight had much increased, she felt active and strong; a year after quite well.

Case 6.—Miss D.; two years' general neuralgia; feeling of misery, and inability to help at home without setting up pains; much emaciation; had gone to a home; floating kidney discovered; was advised operation, but a friend wished her to try my support, which, when applied in consultation with her own attendant, gave the happiest results; health now after two years quite established in every way, and only consented four months ago to have case removed, owing to the comfort she experienced from its use.

Case 7.—Miss G.; under treatment for indigestion in a home; history of bicycle accident two years ago; floating kidney found; kept in bed for six weeks; symptoms unchanged; operation advised, but refused; came to see me; case fitted, worn five months. Organ found fixed in position. Abdominal muscles, originally flaccid, now firm and developed in marked way.

Case 8.—Miss W. consulted me for obstinate indigestion; had been treated carefully by family attendant; no improvement; kidney freely floating; support worn six months; general health so much improved as to permit her return to duties; still advise case to be worn, as kidney not quite fixed.

Case 9.—Mrs. N. had been advised operation for floating organ, with great pain; consulted me by consent of her own attendant; fitted with case, worn two months; went on visits to London, etc.; found weight of case interfere with getting about in the city; left it off; wrote me much relieved of pain, but at that date thought kidney not quite fixed. This to my great disappointment, as perseverance seemed alone required.

Case 10.—Miss H., farmer's daughter; two years' pain; much has been tried; habit of frequently jumping off hay ricks, instead of using ladder like others. Kidney very free; case worn two months; already pain much relieved; continue case.

Case 11.—Miss W.; seven years' pain; much under treatment for it; no relief; floating kidney found; case applied while she was on a visit to friends here; two months have given some relief, but advise to continue, owing to probable long duration of displacement.

Case 12.—Miss M.; some years' dorsal curvature of spine; intractable pains in left hypochondrium. Left kidney freely movable; support worn four months, with result of fixture and freedom from pain.

Case 13.—Miss H.; old standing fixture of right hip-joint of early life; pains in abdomen had been treated by morphia, which disabled her for work as music teacher. Kidneys freely floating; support applied; pains ceased; reported herself as quite well, and at duties eight months after.

Case 14.—Mrs. M. a year ago fell over a trunk on right side; became ill, depressed, weak, emaciated; kidney found very movable; fitted with case, worn for three months; examined eight months after, showed fixture and health restored.

Case 15.—Mrs. B. came from country asking relief to lump in right side, said to be growth ready for operation. Kidney freely loose; examined six months after, organ not quite fixed, but had been able for her household duties; now, fifteen months after, reports quite well.

Case 16.—Hospital patient sent home with case; was well and able to do without case within a year.

Case 17.—Miss B. had been under treatment in the city; no good got by ordinary bandage; had been advised operation; came to see me. Kidney moved freely; fitted with case; she reported relief from pain in four months, and ability to overtake duties from business previously given up.

Case 18.—Miss R.; history of fall on stair; constant pain in right side. Kidney rolling about; was fitted. She returned to sewing work, after three months' use of leads, quite well.

In all but one the displacement existed upon the right side; all were ladies, and so far I have failed to discover this tendency in men. It is remarkable that all patients were suffering from symptoms which could have been included under "indigestion," and many had been so treated without any benefit; also, how completely and quickly the "headaches" ceased after steadying the floating kidney.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

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Pernicious Anœmia. By WILLIAM HUNTER, M.D., F.R.C.P., F.R.S.E., etc. London: Charles Griffin & Company. 1901.

THE name of Dr. Hunter has been so closely associated with the subject of pernicious anæmia, and his published investigations have been so important in influencing opinion in this country with regard to it, that it seems only natural that this volume should come from his pen. The work may be said to be of twofold character. On the one hand, it is an admirable monograph on the disease in all its aspects; and, on the other, it is an account of the author's extensive researches on the pathology of the blood, especially in relation to hæmolysis. The two parts are closely interwoven, and the arrangement of the work is chiefly according to the steps in the inquiry by which he has arrived at his present views. A study of the disease in its clinical and pathological aspects leads him to the conclusion that it is a distinct entity, characterised by excessive and abnormal hæmolysis. This is indicated by the large amount of iron in the liver, especially relatively to the amount in the spleen, and in certain cases also by the amount in the kidneys. The condition of these organs in this respect distinguishes pernicious anæmia from all other conditions. The view as to the hæmolytic nature of the affection is also supported by the changes in the urine, detailed in a later chapter.

The inquiry is thus naturally to hæmolysis, under normal and pathological conditions. This part of the work is of the highest merit, and contains much that is overlooked in even recent text-books. Dr. Hunter distinguishes two kinds of hæmolysis in health—a *chronic* form, in which all the hæmoglobin of decrepit corpuscles is converted into blood pigment, and is taken up by leucocytes and other cells; and an *acute*, in which the hæmoglobin is liberated in the portal circulation, and is broken up in the liver, the iron-free part being excreted as bile pigment, whilst the iron is also excreted in the bile. One is, however, here inclined to ask, Is the amount of iron daily excreted in the bile sufficient to correspond with the amount of hæmoglobin disintegrated, as indicated by the bile pigment? Definite information on this point is certainly desirable. In pernicious anæmia the hæmolysis is of the acute variety, and also occurs in the portal circulation, though it is not a mere exaggeration of the normal, but has special characters of its own. In certain cases the destruction extends to the general circulation, and then the iron is deposited in the kidney cells. The hæmolysis is also different from that in paroxysmal hæmoglobinuria, malaria, etc., and corresponds with that resulting from certain poisons, notably toluylendiamin. This abnormal hæmolysis, probably produced by a special toxine absorbed by the portal blood, is thus the essential feature;

actual lesions of the alimentary canal are of common occurrence, but are not in themselves sufficient, they merely serve as the entrance for the special infection.

The immediate causal agent has not yet been discovered, but Dr. Hunter considers that there is a special infection of the stomach, and that the chief source of this infection is oral sepsis, arising especially in connection with long-standing and neglected cario-necrotic conditions of the teeth. This part of the work will no doubt receive special attention from clinicians, and further observations will be necessary to show to what extent such abnormal conditions of the oral cavity precede the onset of the disease. The question is manifestly one of much importance, from the therapeutical standpoint. The position that the disease is an infection is certainly strongly supported by facts, and the author considers that the infection is probably a mixed bacterial one. This may be the case as far as the growth of the bacteria in the tissues is concerned, but the known facts of bacteriology would rather indicate that such a definite toxic action as must here be concerned, is the result of some specific organism not yet identified.

In a work of this kind, brimful of scientific observation and description, there naturally occur some parts to which criticism might be applied; we might mention, for example, the account of blood formation, which is not so full nor of so high a standard as the rest. But one cannot read the volume without being impressed by the extent of the investigations recorded, by the ability with which they have been planned and carried out, and by the skill with which the results have been arranged and discussed. And we may also add, what has been hinted at above, that, in addition to its importance to pernicious anæmia, it is a contribution to the general physiology and pathology of the blood of a very high order. Dr. Hunter is certainly to be congratulated on having done so valuable a work in scientific medicine, and on having presented the results of his long series of observations and experiments in so readable and interesting a form. ROBERT MUIR.

Aphorisms, Definitions, Reflections, and Paradoxes: Medical, Surgical, and Dietetic. By A. RABAGLIATI, M.A., M.D., F.R.C.S.Ed., etc. London: Bailière, Tindall, & Cox. 1901.

THE hereditary mantle of Hippocrates, Oribasus, and Ægineta has fallen upon Dr. Rabagliati: he has issued the first-fruits of his philosophic musings, after the manner of the ancients, in paragraphic form, even to the total of 552 aphorisms, definitions, reflections, and paradoxes; and, eschewing the records of modern times, disdaining the observations and discoveries of recent years, and dismissing the direct methods of the present, he has cherished the more attractive ways of the past, the ways of philosophical, irresponsible vagary. The mantle, indeed, fits but poorly; it is too tight under the arms, too slack across the shoulders. As an imitation of the garb of ancient authorities it lacks finish; its cut suggests modernity, weakly joined. The text loses most of its value because one subject forms the end, the beginning, circumference, and centre of its circle. The philosophers of old discussed their subjects from wider standpoints; they perhaps believed in certain attributes common to the body, such as cold, heat, dryness, and moisture, antagonism between which caused disease, but they never went the length of assigning almost all ills to one source.

But this author of the twentieth century has contrived to accomplish the feat. His book is atavistic. One of his forefathers in the remote past must surely have issued some such volume. It breathes of olden days. It disregards experimental facts, accomplished deeds; it revels in prehistoric remains. One or two of his aphorisms, definitions, etc. may be instanced:—

1. (No. 2 of text).—"A circle has neither beginning nor end; or it is all beginning or all end." *Note.*—In geometry this axiom holds good; but a geometrical circle is bounded by a hypothetical line without breadth, and of the same character throughout. In another sense it may stand for movement in a true circle.

2. (No. 3 of text).—"Every fact or process in the organic mechanism of the body may be considered as the beginning or the ending of the mechanism. It is therefore immaterial at what point we commence our study of it." *Note.*—The reasoning here is fallacious, for it presumes that the organic mechanism of the body possesses all the attributes of a geometrical circle; while it has only been stated of such a figure that it has neither end nor beginning. No organic mechanism can ever represent a true circle; the latter once made requires no addition, no exertion to keep its shape. Organic mechanisms may display the characteristics of some more or less imperfect circular figure, never those of a true circle. Therefore it does not follow because a circle is all end and all beginning, or has no end nor beginning, that in living mechanisms it is immaterial at what part the study of their attributes commences.

3. (Cf. No. 1 to 552 of text).—Poly-siteism, pollaki-siteism, and kako-siteism occasion or originate nearly as many pathological conditions as are found between the boards of a large medical dictionary.

The author has a pretty wit in coining new terms. "Siteism" is do doubt derived from σίτιον or σίτος, the Greek for aliment, and from which the terms *sitiology* or *sitology* have already been derived. Siteism therefore appears (for nowhere is it strictly defined) to mean "the eating of food," without reference to "the drinking of liquids"—"potism"; the taking of alcohol—"methysm"; nor has it any relation to the kind of food constituting the "siteistic errors." How the epsilon has crept into "siteism" is not clear. The three great causes of disease are thus—Eating too much, eating too often, and, but in less degree, eating evilly. To show that the statement made above in paragraph 3 is not exaggerated, a few examples of the diseases and conditions ascribed mainly to poly-etc.-siteism may be given:—Cancer and corns, barrenness and cramps, anæmia and fevers, sleeplessness and dilated stomach, obesity and emaciation, constipation and chilblains, gout and urethral caruncles, etc. etc.

4. Taking section 332 first, then Nos. 330 and 333, the text runs something akin to:—

(No. 332 in text abridged).—"'Shrinking,' *strictum* or τάσις, is brought about by contraction of the transverse elements of tissues, particularly of vessels; 'swelling,' *laxum* or χάλασις, *per contra* by that of the longitudinal fibres. 'Shrinking' constitutes the 'Izanic,' 'Swelling' the 'Œdanic' condition; the former positive and primary, the latter negative and secondary."

(No. 330 in text).—"Health is present when shrinking and swelling alternate with one another within very moderate limits. When the limits of these alternations are exceeded, disease sets in."

(No. 333 abridged).—"Both these states of the body arise [as a matter of course] from over-eating and eating too often."

Note.—Which is to say, that longitudinal elements of the tissues, and especially of the vessels, pursue a game of see-saw with transverse elements of the same; and that, should they play reasonably quietly, they maintain the body in a healthy state; if obstreperous, or unequally matched, the whole, or some part, of their organic habitation suffers; while exhibitions of excessive agility or of irregularity on their part can be traced to poly-, pollaki-, or kako-siteism. It is somewhat difficult to conceive how one or more of these evil habits so modify the game of metabolic see-saw as to incite in one case development of a corn, in another dilatation of a stomach.

We arrive at this conclusion, that the onset of most of the disorders of health are directly due to, or are facilitated by, over-eating, frequent eating, and harmful eating. It is the conclusion of the "starving-doctor" in a new guise. In no place is an efficient definition vouched for of what constitutes "too much," for the details regarding the use of different food elements in different proportion, varying dietaries, varying circumstances of climate, idiosyncrasy, and habit, are wholly neglected or only casually and superficially referred to. Fats do not appear to be once mentioned in connection with metabolism; indeed, metabolism might not have aught to do with organic life, so far as the book is concerned. Cellular physiology and pathology have no place in it; functional is dissociated from cellular activity, almost from chemistry; the cells foot it too strenuously to measures played by dietetic brazen instruments, are called upon too often, and dance hypothetically and unwisely, not as independent units, but as automatic machines governed by a master of ceremonies of one idea.

Dr. Rabagliati has evidently never as yet nursed a baby. He quotes, with approval, from Oribasus and Ægineta, that very young babies should be fed with milk only twice or at most thrice a day. As a young infant's stomach can only contain about 2 oz., and generally retains less than this, a drink twice a day means that about 3·5 oz., thrice, 5·3 oz. of milk, forms the entire nourishment, given at intervals of twelve and eight hours respectively. The remonstrances of a babe, fed but once in twelve hours, would be forcible, soon after the first twenty-four hours of existence. An average infant of one week old weighs 6·7 lb., and requires normally 9·5 per cent. of its weight of milk, or 10¼ oz.; at two weeks, 15·3 per cent. of its weight; between 17·6 to 19·5 per cent. at the seventh week; after which the percentage decreases. Surely the facts are well recognised, that the less the age is the oftener should feeding be; the oftener the feeding, provided the food given on each occasion be reasonable in amount, the better in the young and the invalid.

It is most probable that healthy adults are the better of taking but two meals a day, provided they individually can tolerate a long fast; that dis-siteism, as the author terms it, is often beneficial; but that for adults in ill health, or who suffer discomfort from long fasts; for infants, children, and youths, pollaki-siteism is to be recommended not condemned, as increase in number of meals does not necessarily imply increase in the quantity of food ingested; while the quantity which is required to satisfy a growing lad, if taken "dis-siteously," would probably incommodate his digestive organs more grievously than the same total taken at three or four sittings. Most adult persons undoubtedly eat too much, and, provided they are in good health, too often; but much depends on the rapidity of their digestive and assimilative processes. Should these functions be quickly performed, and meals few, the idle organs will soon find evil things to hand. In those whose lives are wholly sedentary, dis-siteism is to be recommended; but inability to deal with a full meal is often the lot of such, and lighter meals taken more frequently undoubtedly answer more satisfactorily in such cases.

The author's—well, reflections, upon dilatation of the stomach,—for he regards it as most commonly the result of over-eating and of too many meals a day,—leaves out of account all the numerous, indeed in this country probably the most numerous, examples, arising from cicatrisation of precedent gastric ulcers, from simple pyloric hypertrophy, and of nervous source, quite independently of the quantity of food or the number of meals taken (unless indeed these items arise primarily from this basal cause). How oligo- and oligaki-siteism, etc., can relieve the symptoms of gastric dilatation from pyloric stenosis, already with deficient absorption of nutriment, is difficult to realise.

A. LOCKHART GILLESPIE.

Appendicitis, its Pathology and Surgery. By CHARLES BARRETT LOCKWOOD, F.R.C.S. London: Macmillan & Co. Ltd. 1901.

THERE can be no doubt whatsoever that this excellent monograph is quite the best work on the vermiform appendix which has yet appeared from the London school. Lucidly written, and well illustrated with a beautiful series of micro-photographic reproductions, the book should prove most valuable to the clinician and to the pathologist. The clinical histories of the various cases recorded, the admirable manner in which the pathological changes in the appendix are displayed in the various plates with which the book is plentifully provided, and the careful way in which the treatment is described in each individual case, make the book what it is—the best which has yet appeared on the vermiform appendix, from its clinical standpoint.

In an introductory chapter, dealing with the vexed question of nomenclature, Mr. Lockwood falls foul of several terms in almost universal usage. In the majority of his objections he is right, but in his questioning remarks on Talamon's "appendicular colic" we think he is just as undoubtedly wrong. Talamon used this phrase to denote a clinical symptom, and not to describe a pathological condition. If the terms "renal or biliary colic" are valid descriptions of clinical symptoms, so is "appendicular colic." But to pass on to Mr. Lockwood's own terms. We strongly object to the use of the term "subcæcal," it is misleading and confusing; whilst to describe a "subcæcal fossa" is positively erroneous. The former should, of course, be "post-cæcal," and the latter never under any circumstances lies behind the cæcum; it always lies behind the ascending colon, and should be termed "retrocolic," as has been pointed out by Addison, Moynihan, and others. There is no doubt that surgeons have done much to perpetuate these anatomical errors of nomenclature.

Both surgeons and anatomists, however, owe Mr. Lockwood a debt of gratitude for his original and lucid description of the appendicular lymphatics. These it is impossible to investigate in the dissecting or post-mortem rooms with any marked degree of success; they can only be studied to advantage on the living subject during an operation, and this the author has done with marked skill, and has thereby made a most important contribution to the scientific side of the subject. We trust he will pursue his promised observations on the nerves of the appendix, a subject to which he only casually and doubtingly refers in this monograph.

Mr. Lockwood still adheres to the opinion that the vermiform appendix is never absent, except as the result of disease. In this opinion we agree with him, although it is not without its interest to note that Professor Fawcett of Bristol quite recently showed the Anatomical Society of Great Britain and Ireland two specimens in which there was absolutely no trace of an appendix. Unfortunately, both these specimens were dried specimens, and did not altogether carry conviction, although they possibly afford presumptive evidence that one's opinions on the constancy of the presence of the appendix require a little modification.

Another most important statement which Mr. Lockwood makes in this book, and one which we do not remember to have previously seen in print, is that he has seen an appendix not damaged by inflammation contract upon seizure. Space will not permit our dwelling on the singular significance of this statement, but it is nevertheless one which is pregnant with possibilities.

There are many other points in the book well worthy of notice. The description of the minute structure of a normal appendix is deserving of careful study by those misguided pathologists who have denied the presence of lymphoid tissue in the human appendix, although we think Mr. Lockwood errs in not definitely locating that tissue in the submucosa. The classification of the pathological conditions is good but cumbersome, and the clinical histories and the illustrations of the morbid appendicular processes have neither been excelled, nor as yet even equalled. This is the really valuable part of Mr. Lockwood's present contribution to the literature of the appendix, and as such we can with confidence recommend it to the notice of the clinician, the pathologist, and the scientist; and although it is not always possible to agree with the author in many of his more purely scientific conclusions, there is nevertheless so much in his work that is new, so much that affords food for reflection, and so much that is original, as to more than justify the opening remarks of this notice. RICHARD J. A. BERRY.

A Text-Book of Pathology. By ALFRED STENGEL, M.D. Third Edition.
London: Saunders & Co. 1900.

THIS volume is intended "to supply a moderate-sized book on Clinical Pathology." We do not know what, precisely, the latter phrase is supposed to signify, as the work before us gives much more information than is necessary for the interpretation of the bed-side phenomena of disease. We look on it as an attempt to traverse the ordinary ground occupied by text-books on general and special pathology, and we fear the day is past when pathology can be adequately treated of in a book of the size Dr. Stengel has written. There is no doubt, however, that he has made the most of the space at his command, and the busy practitioner (for it is to him that the volume will be most useful) will find here a very readable summary of pathological knowledge. The style is vivid, on the whole the matter is well arranged, and the facts accurate and up-to-date; but all through the book we feel it is a pity that, with the knowledge the author possesses, he had not boldly faced the preparation of a work against which the charge of superficiality could not have been brought. As it stands it is precisely this charge that the present volume has to meet. The cause, one can see, is chiefly the necessity for condensation; but this has led the author sometimes to make generalisations not justified by facts, sometimes to summarise a subject in classifications which have not a logical basis. Thus, it may be true (though it is by no means as yet proved) that all cases of endocarditis are of bacterial origin, but, from the way the statement is made by Dr. Stengel, one would suppose that the pyogenic cocci and the pneumococcus are the most frequent causes, and this is certainly not correct. Again, it is contrary to scientific treatment of pathology to group together "edematous," fibrinous, and productive processes as *varieties* of inflammation. An apparent desire to divide the book up by means of prominent head-lines has made it impossible to give adequate consideration to the connections existing between different morbid changes, and the absence of this is a defect. For instance, the important part played by endarteritis in aneurysm formation is not brought out, and the two conditions are treated of under separate headings, a mere word indicating the inter-relation. Many other instances of this defect might be given. In consequence, in many parts of the book, notably in the sections dealing with pulmonary tuberculosis, a beginner would be simply bewildered. A meritorious trait in the work is, that the effect of disease structure on the function of the diseased organ in every case is described. We regret that we cannot recommend a work which has many good points, and which contains a very large amount of information, but we do not consider that a proper knowledge of pathology could be obtained from it.

JAMES RITCHIE (Oxford).

A Practical Guide to the Administration of Anæsthetics. By R. J.
PROBYN WILLIAMS, M.D. London: Longmans, Green & Co.

THE author of this work has fully justified the inclusion of "practical" in its title, and has evidently kept this idea before him throughout its preparation. It is almost an ideal handbook of very moderate dimensions, for the use of the student or practitioner. Its freedom from padding, statistics—and, indeed, anything not perfectly up-to-date—is especially to be commended. The "technique" of gas, ether, and chloroform anæsthesia are admirably described, and excellent illustrations of all necessary apparatus are provided. We are pleased to see a detailed description of the continuous administration of nitrous oxide, by the nose, for the longer dental operations—a method of which, after an extensive experience, we can speak very highly. Particularly clear and succinct is the author's description of the exact manner in which death occurs in chloroform toxæmia, about which many have but a hazy notion, and reference to the majority of anæsthetic works will hardly enlighten them. Some surgeons and anæsthetists will be inclined to differ from Dr. Probyn Williams as to the inadvisability of local anæsthesia in operations for goitre. Professor Kocher, who has just concluded his first thousand cases, used local anæsthesia exclusively, finding it quite satisfactory; and if it be explained to the patient with how great risk the administration of a general anæsthetic is fraught, in such cases they will usually be content with the partial solace afforded by cocaine.

To those of the profession who feel at all "hazy" as regards anæsthetic principles and practice, we can most cordially recommend this little work as supplying all that they can reasonably expect to learn about such a practical subject from a book. THOMAS D. LUKE.

Gray's Anatomy, Descriptive and Surgical. Fifteenth Edition. Edited by T. PICKERING PICK, F.R.C.S., and ROBERT HOWDEN, M.A., M.B., C.M. London: Longmans, Green & Co. 1901.

THE last edition of this well-known text-book has been somewhat increased in size chiefly by the addition of a considerable number of new figures. The greatest number of changes, as might be expected, are to be found in the sections dealing with histology and embryology. In the chapter on embryology many useful illustrations, taken from the works of His, Toldt, Van Beneden, Kollmann, and others, have been introduced and will do much to render this chapter comprehensible to the student. Indeed, without numerous illustrations borrowed from the works of Professor His, it would at present be almost impossible to give a clear description or history of the development of man. However, thanks to the labours of such authors as those just mentioned, it is now possible to give a profusely illustrated and consecutive account of human development without introducing, as is often done, figures and diagrams taken from observations made upon lower vertebrates or even invertebrates. This advance will be appreciated by no one more than by students of human anatomy.

In the chapter dealing with histology, and particularly in those pages dealing with the nervous system, several new and useful illustrations will be found. Indeed, throughout the entire work, corrections, additions, and modifications in the text, often small in themselves, and the insertion of extra figures to illustrate new or difficult points, have done much to improve the book and render it more attractive to students. The number of editions to which it has run is a proof of the popularity of Gray's "Anatomy." A. F. DIXON.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF
A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,
MEDICAL REGISTRAR, EDINBURGH ROYAL INFIRMARY.

THE GEOGRAPHICAL SENSE.

APROPOS of the varied harmonic senses, and the loss thereof noted last month, Touche's (*Compt. rend. Soc. de biol.*, Paris, 1901, No. 20, quoted *Centralbl. f. d. med. Wissensch.*, Berlin, 1901, No. 43) note of a case of "atopia" (to coin an analogous term) is worthy of mention. A male, æt. 71, with severely sclerosed vessels, experienced an epileptiform attack of undoubted cerebral origin, which was followed by complete loss of geographical memory; thus, he knew his own house by sight, but could not for the life of him say where it lay. His colour sense, to the finest gradations, he retained. In time he died, and dead exhibited a small patch of softening in the area of the brain supplied by a patch of the left posterior cerebral artery, with superficial necrosis of the outer half of the middle third of the lobus fusiformis below the margin of the third temporal convolution. Moreover, Touche has already recorded an instance of topographical amnesia, where the entire area supplied by the left posterior cerebral artery was involved in a destructive lesion, so that this specialised sense apparently pertains to the lobus fusiformis.

PARADOXICAL LOCAL HYPERTHERMIA IN A CASE OF PNEUMONIA.

HOTON (*Arch. méd. belges*, Bruxelles, Oct. 1901, p. 217) met with a case of pneumonia in a male, æt. 66, stout, arthritic, with sclerosed vessels; active in habit, despite some chronic bronchitis, with emphysema and dyspeptic troubles. Since an apoplectiform stroke, five years before, his temper had not been so well under control, while a little verbal confusion now and then had been noticed.

At four in the afternoon, one day, the patient sought his bed directly upon reaching his home, after a journey by rail; for he felt indisposed. A violent rigor followed. He was seen next day, when he was found to be suffering from headache, slight dyspnœa, intestinal flatulency, and a pulse, full and strong, of 100. He mixed up his words on speaking, presented slight symptoms of delirium, and all the signs of a pneumonic invasion at the base of the right lung. On the fifth day of the disease the temperature fell to normal, and resolution of the affected pulmonary area seemed to have commenced. Throughout, however, the headache had persisted. On the sixth day the left lung developed a patch of pneumonia, with delirium, restlessness, refusal of food, and a full pulse; the temperature rose to 39° C. (102°·2 F.). Next day his condition was grave; the pulse failing in strength and rhythm for the first time. Alcohol was given by the mouth; caffeine hypodermically. The eighth day found the pulse improved in tone, although still 120; marked lowering of temperature; improvement in the state of both bases; less delirium, with frequent lucid intervals.

The hope raised by this improvement was dashed anew three days later, when various small areas of pneumonic consolidation in different parts of both lungs developed, implying the presence of "erratic" or "ambulant" pneumonia, and, as frequent in such, of ephemeral duration. The patient was now semi-comatose. Two days later ptosis of the right eyelid, facial paralysis on the left side, and unequal paretic pupils were noted. Death on the sixteenth day of the disease.

The temperature curve was typical of pneumonia up to the fall on the eighth day, signifying the commencement of resolution of the pneumonic process in the left lung. Afterwards the curve became atypical. From the evening of the eighth day the details of temperature were—

Day of Disease.	Temperature.				Difference of the Temperature in the Palm.	
	Axilla.		Palm of Hand.			
	C.	F.	C.	F.	C.	F.
Eighth, P.M. . .	37°·2	98°·9	...	...	...	...
Ninth, A.M. . . .	38°·3	100°·9	...	...	...	...
,, P.M. . .	38°·1	100°·6	...	...	...	...
Tenth, A.M. . .	38°·4	101°·1	...	...	...	...
,, P.M. . .	37°·3	99°·1	39°·0	102°·2	+1°·7	+3°·1
Eleventh, A.M. . .	37°·0	98°·6	38°·2	100°·7	+1°·2	+2°·1
,, P.M. . .	37°·3	99°·1	37°·9	100°·2	+0°·6	+1°·1
Twelfth, A.M. . .	37°·3	99°·1	37°·8	100°·0	+0°·5	+0°·9
,, P.M. . .	36°·8	98°·2	37°·5	99°·5	+0°·7	+1°·3
Thirteenth, A.M. . .	37°·1	98°·8	37°·6	99°·7	+0°·5	+0°·9
,, P.M. . .	37°·2	98°·9	37°·8	100°·0	+0°·6	+1°·1
Fourteenth, A.M. .	37°·4	99°·3	37°·4	99°·3	±0	±0
,, P.M. .	36°·8	98°·2	38°·3	100°·9	+1°·5	+2°·7
Fifteenth, A.M. . .	39°·8	103°·6	39°·4	102°·9	−0°·4	−0°·7
,, P.M. . .	40°·6	105°·0	39°·9	103°·8	−0°·7	−1°·2
Sixteenth, A.M. . .	40°·4	104°·1	39°·4	102°·9	−1°·0	−1°·8

Thus from the evening of the eighth day the temperature in the axilla hardly showed any correspondence with the pulmonary condition, until the day before death. Because these temperature readings were so out of harmony with the other physical signs and symptoms, the temperature of the palm of the hand was concurrently taken (the fingers closed over the thermometer's bulb) from the tenth day onwards, with surprising results. Until the day preceding death, the palm gave higher figures than the axilla; and, further, the variations of temperature in the palm fail to agree from day to day with those afforded by the axilla.

Two facts are especially patent, therefore—(1) That in this case there was no correspondence between the temperatures as obtained from the axilla and hand at the same time; (2) that by neither the one series nor the other was any indication of the course of the disease vouchsafed.

THE DIAGNOSTIC SIGNIFICANCE OF GASTRIC SPLASHING SOUNDS.

SCHÜLE (*Arch. f. Verdauungskr.*, Berlin, 1901, Bd. vii. Hefte 4, 5) says of the splashing sounds produced by lighter or heavier direct percussion of the anterior abdominal wall or by succussion, that few symptoms in gastric pathology are regarded from so many different standpoints by different authorities. Thus some consider their existence to be almost certain proof of the presence of a flabby walled stomach; others again opine that they are of no account.

In healthy individuals splashing sounds can often be elicited at various times of the day, if the gastric area of the anterior abdominal wall be forcibly percussed and the stomach contents agitated, provided the organ contains both fluid and gas; succussion frequently also suffices to produce such sounds. Persons with healthy stomachs, however, do not afford these splashing sounds upon gentle superficial percussion, or on slight bodily movements.

In fact, the truth of the matter comes to this, that both in health and in patients with gastric disease, presence of *clapotement*, which can only be induced by strong and deep movements of direct percussion, signifies nothing; while, on the other hand, when such splashing sounds can be caused by light percussion blows, some weakened condition of the gastric musculature is certain. Two forms of this weakness can be differentiated, one in which the stomach itself is to blame; one where it suffers as well, primarily or secondarily, from inefficient abdominal pressure. Gastric splashing sounds, produced by slight agencies, are symptomatic of gastric atony, gastroptosis, dilatation, nervous dyspepsia. No conclusion can be drawn as to the degree of atony present from the ease with which the sounds can be evoked; often, in the earliest stages of gastric atony, this symptom is readily and strikingly evident.

DISEASES OF SCHOOL LIFE IN NEW ZEALAND.

THE President of the New Zealand Branch of the British Medical Association, G. R. Saunders (*New Zealand Med. Journ.*, May 1901), made this important subject the basis of his address at the annual meeting of the branch last March. He first referred to spectacles, quoting Cohn's 1867 results—1072 short-sighted scholars amongst 10,060; the proportion rising directly with the number of years passed in school life; and then to several later corroborative observations. In New Zealand, however, myopes are few, hypermetropes numerous; indeed, as about 1 to 10 respectively, among her school children.

As myopia is rare in babes, hypermetropia the rule, and as the latter normally passes on as tissue advances into emmetropia, myopes usually acquire their ocular error, hypermetropes fail to attain emmetropia, and in course of time frequently become myopic. The actual reason why the eyes of New Zealand scholars, subjected to long-continued work in imperfect light, in cramped position, and to study of indifferent and badly defined founts of type, tend to become hypermyopic rather than myopic, contrasting with most other places, is obscure; perhaps is racial.

Proceeding to consider school work, as commonly carried on in New Zealand, he notes the great number of girls who suffer from anæmia; the many cases of "nervous instability, indigestion, and carious teeth"; and blames overwork, progressive examinations with consequent "cram," for them.

"These children, unconsciously, are really wise in their generation" —(*i.e.* those who "become lazy spectators" of the work done by the ablest in each class, "seeing that they cannot digest the work of the standard")—"because they are reserving their bodies and minds for future use" [and it might be added, often for more successful use.— A. L. G.]

Competition for scholarships, teachers and parents encouraging undue efforts on the part of boys or girls, hoping to gain credit for powers of teaching, or domestic éclat respectively, he denounces warmly as a source of many evils. His later remarks are too superficial to merit notice.

[Probably the ideal system of education, mental and physical,— intelligent and capable cultivation of individual "turns" and traits,— dissociated from the method by which every youngster has to grind at the same routine subjects, while the powers that be show a contemptuous disregard for any particular line they may evince some aptitude for. In play, the same; compulsion neutralises benefit; no boy or girl, but some game has its attractions for; force all of them to engage, willingly or unwillingly, only in games established by official edict, although the willing may gain, the unwilling lose; for even should the latter gain in material well-being, they suffer much in mind.—A. L. G.]

OTHER METHODS OF TREATING DIPHTHERIA IN ADDITION TO ANTITOXINE.

GRIFFITH thinks that we are in danger of putting too much dependence on antitoxine, and holds that it is still of great importance to attend properly to the other therapeutic measures, medicinal and otherwise, with which the antitoxine can be aided. Thorough isolation is needed, to prevent infection, with careful disinfection of everything which has been in contact with the patient. Children should be removed and quarantined for ten to fourteen days. The nurse should wear caps covering the hair, and the visiting physician should put on a rubber overall and a bathing-cap. The room should be at the top of the house, and, if possible, entry be through another room. A carbolic sheet may be hung in the door, though it is doubtful if it does any good. All upholstered furniture should be removed, and the carpet replaced by old rugs, which must be destroyed subsequently. The meals should be brought to the door of the anteroom, whence the nurse should remove them. All utensils must be sterilised. After the disease is over, the room should be washed with a disinfectant and steamed with formalin, then painted and repapered. For their own safety all members of the household should use antiseptic solutions, for gargling and spraying noses and throats. After the disease is over, the patient must be isolated for three weeks, or till the bacillus disappears from the throat. During the attack the nursing must be very careful, sudden movements being dangerous owing to cardiac weakness. The diet should be liquid, and later semisolid, to spare stomach and kidneys. Local treatment does much good. Nasal diphtheria is best treated with antiseptic syringing. The patient should be recumbent, with the head well turned to one side and the fluid injected into the upper nostril. All solutions must be tepid. Spraying seems to be less disagreeable, but resistance often causes exhaustion; when well borne it should be frequently employed. The solutions used should be cleansing and inhibitory to bacterial growth rather than bactericidal, which are irritating. Weak alkaline antiseptic sprays are good, but boric acid perchloride (1 in 5000), or peroxide of hydrogen if active, not acid, may be used freely diluted. If acid it should be neutralised with soda or lime water. For pharyngeal diphtheria swabbing or syringing may be used, provided resistance does not cause exhaustion. The author prefers peroxide of hydrogen in full strength or slightly diluted, immediately followed by Löffler's solution, applied in a swab held against the affected parts for a few seconds. This is painful, and must not be repeated too often. For laryngeal cases inhalations are best. Most useful is employment of steam, provided enough vapour is generated either by plunging red-hot bricks into water or by using a croup test. The ordinary plan of letting a pan simmer is no good in a large room. The author does not think that much good is got by adding antiseptics to the water. For general treatment the author recommends powerful supporting measures. He uses alcohol in large doses, with strychnine, when the pulse lacks tone, or cardiac failure is impending. Digitalis is also frequently employed.—*Therap. Gaz.*, Phila., July 1901.

SURGERY.

UNDER THE CHARGE OF

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The Trendelenburg Position in relation to Stone in the Bladder.

Guiard, in writing on certain special points in the treatment of cases of enlarged prostate, points out the value of the Trendelenburg position in sounding for and in crushing stone. When the middle lobe is affected, it projects into the bladder in such a way that instruments introduced by the urethra must necessarily pass over it before reaching the *cul de sac* behind the middle lobe in which a stone is most likely to lodge. Hence it is difficult or impossible to strike a stone under these conditions, and even if one succeed in touching it, it may be impossible to grasp it between the blades of the lithotrite. If the table or bed be inclined so that the summit of the bladder becomes the most dependent point, then the stone becomes readily accessible. If the stone tends to remain in the pouch behind the prostate, in spite of the altered attitude of the patient, the pelvis should be shaken once or twice so as to dislodge it. The tilting of the table must be very pronounced in order to obtain the full advantage of the posture, both in sounding and in crushing the stone, and to allow of the more certain evacuation of all the fragments. The advantages of the Trendelenburg position in suprapubic cystotomy are already sufficiently known.—*Ann. d. mal. d. org. génito-urin.*, Paris, September 1901.

INTRA-ABDOMINAL RETENTION OF TESTES TREATED BY OPERATION.

Routier reports the case of a man, æt. 21, who suffered from pain in both iliac fossæ. The pain was increased by pressure, and the scrotum was found to be empty. Since the age of 13, however, he had experienced erections, and since 18 he had performed the sexual act at frequent intervals. On palpation, a small swelling was felt in the upper part of the inguinal canal on the right side, but nothing on the left. An operation was proposed, the object being to place the testicles in the scrotum, and a promise given not to remove them. The right inguinal canal was opened up and the testicle exposed, but it was found impossible to pull it outwards because of the close adhesion between its tunica vaginalis and the peritoneum lining the iliac fossa. The testicle appeared to be of normal size and consistence, and the pain which the patient complained of appeared to be due to its being pressed upon. The testicle was therefore liberated from its surroundings and left free in the abdomen, being attached only by the tunica vaginalis, which had been opened. A similar operation was performed on the left side. The patient was entirely freed from his sufferings, and had resumed his usual sexual habits. As before the operation, the semen was devoid of spermatozoa.—*Ann. d. mal. d. org. génito-urin.*, Paris, October 1901.

THE ATTITUDE OF THE PATIENT IN OPERATIONS IN THE REGION OF THE DIAPHRAGM.

Kelling of Dresden refers to the difficulty of access to the parts under cover of the ribs. He deprecates Lannelongue's procedure of resecting the ribs as adding to the severity of the operation. In extensive excisions of the stomach, and in operations on the upper surface of the liver, it is possible to expose the region of the diaphragm by placing the patient in an attitude in which the head and thorax are fixed to the table in the horizontal plane, the trunk is bent in the region of the loin to nearly a right angle, and the pelvis and lower limbs descend vertically to the ground. The upper part of the trunk must be fixed to the table by straps. To obtain better access to the subphrenic region, the median incision in the linea alba should be supplemented by an extensive horizontal incision at the level of the apex of the twelfth rib. To prevent the viscera falling out of the abdomen, a towel is placed over them, usually below the stomach, its margins fixed with clamp forceps, and the central portion pressed down on the viscera by the hand of an assistant. The other hand of the assistant pulls the ribs upwards. When working in the subphrenic space, it may be an advantage to divide the suspensory ligament of the liver.—*Centralbl. f. Chir.*, Leipzig, 19th October 1901.

PARTIAL EXCISION OF THE THYROID IN EXOPHTHALMIC GOITRE.

SCHULTZ records a series of twenty cases treated as above in the Eppendorf Hospital in Hamburg. Chloroform was the anæsthetic employed. The results strongly support the view that the thyroid gland is responsible for the clinical features of Graves' disease, for the operation was followed by slowing of the pulse, improvement in the general condition of the patient, and diminution of the exophthalmos. The portion of thyroid left behind became smaller. In eighteen of the cases the results were entirely satisfactory. The author does not recommend recourse to operation until medical treatment has been tried and found wanting.—*Centralbl. f. Chir.*, Leipzig, 19th October 1901.

DIAGNOSTIC VALUE OF LUMBAR PUNCTURE IN FRACTURES OF THE SKULL.

TUFFIER and Milian have drawn attention to this, and have shown that the presence of blood in the cerebro-spinal fluid, withdrawn by lumbar puncture, may afford valuable corroboration of the existence of a suspected fracture of the skull, and conversely that, if the fluid is clear, there is probably no fracture. Tesson records the case of a man, æt. 37, admitted to hospital in a dazed condition, after having fallen a height of 6 ft. from a ladder. There was a contused wound over the left parietal eminence, and bruising of the eyelids on the same side. He remained in a semi-comatose condition, with intervals of restlessness, during which he would get up and walk about the ward. On the sixth day he became more comatose, and three days later he died. The ecchymosis of the eyelids did not extend to the conjunctiva; there was no bleeding from the mouth or nose; there was occasional spasmodic contractions of the muscles of the face, sometimes of one side, sometimes of the other. Lumbar puncture was practised on the fourth day, and several cubic centimetres of fluid, uniformly tinged with blood, were drawn off. The procedure was repeated on the eighth day, and the fluid withdrawn was absolutely clear. It was difficult to interpret these phenomena. At the sectio a fine fissured fracture was found, starting at the left parietal eminence and running down to the sphenoidal fissure, the dura was neither detached nor torn, and the corresponding surface of the brain was absolutely intact without a trace of hæmorrhage. On the opposite side there was marked contusion and laceration of the external surface of the temporo-sphenoidal lobe. There would appear to be no doubt that the hæmorrhagic coloration of the cerebro-spinal fluid was due to this laceration of the brain by contre-coup and not to the fracture *per se*; and inasmuch as such contusion of the brain may occur apart from fracture, and that cerebral hæmorrhage can occur apart from injury, the presence of blood in the cerebro-spinal fluid, obtained by lumbar puncture, is by no means a characteristic sign of fracture of the skull.—*Gaz. d. hôp.*, Paris, 22nd August 1901.

SURGICAL TREATMENT OF HYDATIDS OF THE KIDNEY.

ALBARRAN, in reporting a successful case of nephrectomy for this condition, lays down the lines of treatment as follows:—If a laparotomy has been performed in the absence of a definite diagnosis, the kidney should be laid open from the loin and drained—nephrostomy. If, on the other hand, the kidney has been exposed from the loin, the cyst should be opened and emptied, and the possibility of removing the germinal membrane considered. If this is impossible, the line of procedure will depend on the condition of the kidney. The kidney being still useful, one may either resect that portion of it containing the cyst, or, where this is impracticable, resect as much of the cyst wall as possible, and drain. The kidney being irretrievably damaged, it should be excised bodily, if it can be easily shelled out from its surroundings, otherwise it is merely drained. The diagnosis was easy in Albarran's case, for the patient not only had a large, tender, painful swelling in the loin, but she passed fragments of hydatids in the urine.—*Presse méd.*, Paris, 24th August 1901.

THE SUTURE OF NERVES AND TENDONS.

IN place of the decalcified bone tubes and other materials employed to bridge over the gap between the divided ends of a nerve, Lotheissen strongly recommends the use of tubes of gelatin which have been hardened in a 2 per cent. solution of formalin. These tubes undergo absorption more or less rapidly, according to the time which they have been preserved in formalin; in the suture of nerves, therefore, in which regeneration may be delayed for months, tubes should be employed which have been hardened for six or seven days. In suturing tendons such tubes may be very valuable, inasmuch as they may prevent adjacent tendons becoming fused with one another.—*Centralbl. f. Chir.*, Leipzig, 12th October 1901.

REMOVAL OF THE HEAD OF THE FEMUR IN IRREDUCIBLE DISLOCATION OF THE HIP.

JACOB of Lyons records the case of a man who met with an accident, but did not attend at the hospital until after an interval of eighty-three days. The limb was shortened by 6 cms., and presented the usual features of a dorsal dislocation. Attempts at reduction under chloroform were not successful. Continued extension for a fortnight by weight and pulley only diminished the shortening by 1½ cm. The joint was exposed by Langenbeck's incision, and the insertion of the gluteus medius and capsular ligament separated by the rugine. Reduction being still impossible, 2 cms. of the head of the femur were removed, and reduction accomplished, the stump of the neck being inserted into the acetabulum. Absolute rest was maintained for three weeks, followed by massage and exercises. Radiography showed that the neck still remains in the acetabulum, there is no shortening, and the patient walks with a scarcely appreciable limp.—*Rev. de chir.*, Paris, October 1901.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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SIMULTANEOUS EXTRA- AND INTRA-UTERINE PREGNANCY.

STRAUS (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xliv. part 1) refers to the comparative rarity of this condition, and tabulates thirty-two cases collected from various sources. He describes a case of his own, as follows:—Patient, æt. 34, was admitted to hospital in August 1899, complaining of hæmorrhage, after two months' amenorrhœa. She had had two normal confinements, the last three years ago. On examination the patient complained of pain in the right iliac region. The cervix was soft, and the uterus was enlarged to the size of a three months' pregnancy, and in the right fornix, pressing the uterus forwards, there was felt a tumour the size of a child's head. The left fornix was free. There was slight uterine hæmorrhage. The swelling in the right side increasing in size, laparotomy was performed. The right tube, distended with blood clots, and the corresponding ovary were removed, and a considerable quantity of blood clot was cleared out of the abdomen. The uterus was soft, hyperæmic, and corresponded in size to a twelve weeks' pregnancy. The recovery from the operation was satisfactory, and the uterine bleeding ceased. On the 11th September, the patient complained of pain in the right inguinal region, associated with a rise of temperature and pulse, the cause of which was diagnosed as crural thrombosis. On the 23rd September, a three months' fœtus was expelled from the uterus. On the 27th, there was another rise of temperature and pulse, accompanied with copious uterine hæmorrhage. The latter was found to be due to a piece of retained placenta. The removal of this was followed by continuation of fever, rigors, and tympanitis. She improved so far as to be allowed to leave her bed on the 14th October, and shortly afterwards left the hospital by her own desire. She died suddenly on 3rd November, the cause of death being regarded as pulmonary embolism.

Straus describes, in detail, the condition of the uterus and appendages, and concludes that the case was one of tubal abortion with uterine pregnancy. No trace of a fœtus being found in the blood clot removed, microscopic examination of the tube showed distinct villi; in the fimbriated extremity, Langhans' layer and syncytium were distinctly differentiated, and are clearly shown by a diagram accompanying the paper.

On searching through the literature on this subject, Straus finds that the first reported case is that of Gossmann, in 1820. Up to 1899, Straus was able to collect thirty-seven cases, including his own. Of those, thirty-two were described in detail, and these he tabulates. From the tables we find that the average age of the patient was 35. Of thirty-two mothers—five were 1-para; six were 2-paræ; three were 3-paræ; one was 4-paræ; two were 5-paræ; four were 6-paræ; one was 12-paræ. The situation of the ectopic pregnancy was most frequently in the left tube (thirteen times); in the right tube, 7 times; each ovary, one time; tubal (side not mentioned), twice; tubo-ovarian, once; abdominal, seven times.

In thirteen cases each fœtus had reached the full time of pregnancy. In four cases both were born alive, and in two they continued to live, the extra-uterine fœtus being removed by laparotomy. In one case the mother and both children survived. With regard to diagnosis, in five cases this was made before the delivery of either fœtus. In nine cases the diagnosis was made after the spontaneous birth of the uterine fœtus. The condition in six cases was only discovered at the post-mortem: six times during laparotomy, twice after uterine abortion, twice after uterine abortion following upon laparotomy. Straus finds only one case where, after laparotomy for an extra-uterine pregnancy, the uterine pregnancy went on to full time, and a living child was delivered.

Of the thirty-two mothers, fourteen died, although it must be noted that ten of the deaths occurred between 1820 and 1879, before laparotomy was resorted to in the treatment of extra-uterine pregnancy.

A NEW METHOD OF TREATING CHRONIC PELVIC EXUDATIONS.

POLANO (*Centralbl. f. Gynäk.*, Leipzig, 1901, No. 30) has been induced, by the good results obtained in the treatment of joint affections by hot air, to try the same for pelvic exudations. He has constructed an apparatus consisting of an upper and lower concave box, the lower one having three padded divisions, on which rests the patient's back, buttocks, and thighs. A Bunsen burner is placed on the side, and the lower and upper parts of the apparatus are fastened by screws to enclose the patient's chest and abdomen. The first *séance* lasts twenty minutes, the temperature being 120° C. The temperature is gradually increased, so that by the eighth day the patient is exposed to a temperature of 150° C. for three-quarters of an hour. The temperature is gradually lowered before the patient is put back to bed.

Polano reports a case where a hard exudation, extending up to the level of the umbilicus on the right side, disappeared after twenty applications. Also a case of infiltration of the abdominal wall, which originated in a laparotomy, was removed after fourteen sittings. He quotes a case of actinomyces relapsing after incision and scraping of the infiltrated pelvic walls. After twelve applications of the hot air a distinct softening of the swelling was noted, and after free incisions the wound rapidly healed under further hot-air treatment. He points out that the most notable feature of this treatment is immediate relief of pain, as shown by patients, requiring to be lifted into the apparatus, being able to do so unaided after a few applications.

SUPERNUMERARY URETER.

WERTHEIM (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xiv. S. 2) describes such a condition. The patient had suffered from incontinence since birth. On examination, it was found that an intermittent flow of urine occurred from a small opening at the border of the urethral orifice. After several unsuccessful attempts, Wertheim formed an anastomosis between this, which was a third ureter, and the bladder. He has observed two similar cases.

ETIOLOGY OF MENSTRUATION.

HALBAN (*Centralbl. f. Gynäk.*, Leipzig, 1901, No. 25) describes his experiments, which he believes show that menstruation is due, not to the rupture of a Graafian follicle, but to some influence of ovarian secretion. The ovaries of four baboons were removed, and implanted subcutaneously; two continued to menstruate, but ceased to do so when the transplanted ovaries were removed. Those experiments seem to be inconclusive and open to obvious criticisms.

DEFORMITIES OF THE FŒTAL HEAD.

BANNAIRE and Schwale (*Bull. Soc. d'obst. de Paris*, No. 4) contribute an article on deformities of the head in breech presentations with scanty liquor amnii. In such cases uterine contractions force the head to one side till it rests on one of the shoulders or the thorax, causing a flattening of the opposite anterior parietal regions. In many cases congenital torticollis and hæmatoma of the sterno-mastoid muscle follow. Traction on the body, in delivery of the head, in breech cases, produces a greater strain on the shortened muscle, and tends also to produce the above-mentioned results.

THERAPEUTICS.

UNDER THE CHARGE OF

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TREATMENT OF MORPHIA HABIT.

PETTEY holds that very little improvement has been made in the treatment of these conditions. Burkhart's gradual withdrawal plan is based purely on theoretical grounds, and in practice is quite unsuccessful, as the long-drawn-out suffering exhausts and weakens the will power of the patient and tends to promote relapses. Levinstein recommended sudden withdrawal without previous treatment, alcohol and stimulants being used to support the vital functions; but the sufferings are usually so severe that eventually morphia has to be given. Another method is the rapid-reduction plan of Erlenmeyer, in which, without preparatory treatment, the dose is reduced to one-third on the first day, and each following day further reductions are made, so that by the fifth to the tenth day the drug is entirely withdrawn. Under all these methods certain serious symptoms occur, the most important being intestinal colic, nausea, vomiting, diarrhœa, often uncontrollable; rapid, irregular heart action, with collapse and extreme prostration; pain, extreme hyperæsthesia, and insomnia. Previous writers have been forced to treat these complications symptomatically, and have looked upon them as being unavoidable and due to the withdrawal of the drug. From this view Pettey dissents. He holds that most of them can be prevented by proper eliminative treatment before the drug is withdrawn. Morphia checks and diminishes all secretions, and thus elimination both of the drug and waste products is deficient. The intestinal symptoms and those due to collapse are held by him to be symptoms of deficient elimination. He points out that morphia habitués lead quiet lives, have deficient peristaltic action causing overloading of the bowels, which leads to periodical attacks of nausea and vomiting, which are controlled by increasing the dose. Now, on withdrawing the drug, the sympathetic nervous system again becomes active, and diarrhœa and collapse result from its efforts to get rid of the accumulation of waste matter. The portal system, being gorged and hyperæmic, embarrasses the cardiac action. Pettey holds that an essential part of treatment consists in getting the bowels thoroughly flushed out before the morphia is withdrawn. He does this by means of large doses of strychnine, combined with ext. casc., calomel, and powdered ipecac. Four doses, at intervals of two hours, are given, and the stomach is kept empty till purgation has occurred. To keep the patient comfortable during this time, he is allowed to take some morphia. After another eight hours, a large dose of citrate of magnesia is given to complete purgation, and relieve the portal system. If a hot-air bath be now given, to aid cutaneous excretion, the patient will probably escape most of the unpleasant symptoms resulting from the withdrawing of opium. To save the heart, the patient should be kept in bed. Should the heart need support, 1 to 2 grs. of sparteine sulphate may be given hypodermically. When elimination has been thoroughly established, the morphia may be absolutely cut off without gastro-intestinal disturbance, but mental and nervous symptoms usually continue for about two to three days. To tide the patient over this anxious time, hyoscine hydrobromate may be given. It can be given at the end of the eliminative treatment, or as soon as abstinence symptoms develop. Small doses should be given at first, till pain is relieved and sleep is obtained. The patient is then kept under the action of hyoscine for twenty-four to forty-eight hours, until all desire for morphia has gone, when he will sleep well and have a good appetite. In order to strengthen self-reliance, the patient should be thrown on his own resources as quickly and as fully as possible. No stimulants or tonics should be given; but for ten days to two weeks the patient should be kept from his friends till self-reliance is fairly established, as such patients have usually completely lost their individuality and become entirely dependent on the sympathy and guidance of relatives. So long as a patient is taking tonics, he is apt to fancy he is receiving some extraneous support, and this weakens his self-reliance. The aim of treatment is not merely to break off the drug habit, but to fit the man for ordinary life again. Then a protracted treatment, tending to invalidism, is not advisable. This method of treatment is equally applicable to other drug habits.—*Therap. Gaz.*, Philadelphia, October 1901.

ON THE TRANSIENT EFFECT OF DIPHTHERIA ANTITOXINE.

RENOUX records a case which shows that the immunity produced by the antitoxine does not last long, and that the bacilli may recover their virulence as the effect of the antitoxine wears off. The patient was a child, æt. 4, who was suffering from diphtheria. Antitoxine was freely used, in all about 80 c.c. were injected. The throat improved, the membranes were cut off, and the patient recovered, with the persistence of slight hoarseness and a moderate degree of paralysis of the soft palate. After three weeks of apparent recovery, Renoux was sent for again, when he found that the child had again become attacked by diphtheria, which this time did not yield to serum, and the child died after a very brief illness. Evidently the effect of the serum had exhausted itself in the short period of three weeks, during which time the bacilli had retained their virulence unimpaired.—*Indépend. méd.*, Paris, September 4, 1901.

INDICATIONS AND CONTRA-INDICATIONS FOR THE BISMUTH TREATMENT OF GASTRIC ULCERS.

FLEINER communicated a paper on this subject to the Congress of German Doctors held in September in Hamburg. The object of the bismuth treatment is to protect the surface of the ulcer from the food passing over it, which tends to break off the tender granulation tissue. Bismuth is also indicated in mild cases, when a change is being made to solid diet, and on the occurrence of complications during convalescence. Bismuth must always come in contact with the ulcerated surface, so it should be given on an empty stomach. The best plan is to wash out the stomach with one of the mineral waters, and then, half an hour later, 75–150 grs. of bismuth, mixed with water, may be given. The dose can be gradually reduced, *e.g.* by mixing it with magnesia. In other cases, directly after the washing out, 150–300 grs. of bismuth may be mixed with 5 oz. of water, and poured in. Changing the position of the patient is useful to distribute the bismuth. Bismuth has only transient effect in pyloric ulcers with secondary sclerosis. In these cases early gastro-enterostomy is indicated before the strength has been reduced by inanition. Another class of cases unsuitable for bismuth is that where the ulcers have firm, hard walls, while the floor has formed diverticula, and similarly where the stomach wall has been ulcerated through, and adhesions to neighbouring organs have occurred. In such cases the bismuth collects in the hollows, in the form of black reduced bismuth, which can be recognised on washing out the stomach, and in this way may even be diagnostic of these conditions. Ewald and Leuhartz, in the subsequent discussion, agreed that there was no danger of poisoning.—*München. med. Wchnschr.*, 1901, No. 42.

NEW TREATMENT OF CANCER.

Löffler points out in this paper that the danger of treating malignant tumours, either by the inoculation of erysipelas, as Fehleisen suggested, or tubercle bacilli, as Baumgarten proposed, is considerable, as neither of these induced diseases can be readily controlled. He points out that in malaria districts, and in the tropics generally, malignant disease is very uncommon, and suggests that it would be worth while to try the effect, in malignant tumours, of inoculating malaria, which can be easily removed by quinine.—*Deutsche med. Wchnschr.*, 1901, No. 42.

THE COAGULATING ACTION OF GELATIN.

Zibell considers all the explanations put forward regarding the action of gelatin as unsatisfactory. He holds that the action may be due to the presence of inorganic constituents, such as calcium. With this object in view he has analysed several specimens of gelatin, and finds that calcium is constantly present in the proportion of about 0·6 per cent. Consequently a patient in an injection of 100 c.c. of a 5 per cent. gelatin solution receives $\frac{1}{16}$ gr. of calcium, probably in an easily absorbable form. He points out the deposits of calcium in the diseased arterial walls, and concludes that probably the coagulating power of gelatin depends primarily on its calcium.—*München. med. Wchnschr.*, 1901, No. 43.

DISEASES OF THE EYE.

UNDER THE CHARGE OF

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ASTHENOPIA.

There can be no doubt that in the United States the wearing of glasses is very much more frequent than it is even with us; a much larger proportion of the population seems, even to the casual observer, to find the need of such assistance. Presumably, therefore, asthenopia is more common there than here. This relatively greater frequency of asthenopia and spectacle-wearing is, says Howe of Buffalo, U.S., to be attributed to several circumstances, of which he names the following three:—(1) Carelessness in the use of the eyes, for every one in America is constantly reading journals, and these journals are larger and worse printed than those in this country, and they are read in trains, "on the cars," and at all other equally suitable and unsuitable times. (2) The constant hurry and bustle of modern American life is injurious to the nervous system, is conducive to mental and nerve strain, which brings to light imperfections which otherwise might remain innocuous. (3) The American upsets his digestion by eating more meat and devouring it more hastily than the Briton; he also consumes too little fluid, certainly less than the average man in other countries. He adds that if an American finds anything to be amiss he will be satisfied with no alleviation which stops short of perfection; and the American patient finds the surgeon whom he consults in possession of so fine an array of instruments for testing his refraction, muscle-balance, and what not, and his optician able to turn out so beautiful an article in the way of eyeglasses, as contrasted with the testing apparatus and the mechanical workmanship of other countries, that he is more than content to wear correctors of even minimal degrees of error. Some of Howe's reasons may be quite correct, and it may be that the American is guilty of the three unwise actions mentioned by him; but it is surely mistaking cause for effect to say that he wears glasses out of admiration for his surgeons' outfit and his opticians' mechanical skill! Surely these are developments brought about in answer to the demands of the public.—*Am. Journ. Ophth.*, N. Y., August 1901.

TRAUMATIC MYOPIA.

It is a fairly frequent occurrence after a blow upon the eye, that though distant vision is very dim, it may be much improved, if not actually brought up to normal again, by the use of a concave lens; there is, in short, a condition of traumatic myopia. This alteration of refraction is usually quite temporary, passing off gradually in a space of time measured generally by days; occasionally it may last into weeks. It is quite possible that the condition is more common than is supposed, for a number of the injuries such as may cause the lesion are never seen by any doctor at all, and are certainly never tested with lenses; the temporary loss of sight is simply attributed vaguely to the blow, and no inquiry is made. What, then, is the mode of production of this peculiar accident? Bouchart divides the cases into those in which there is accompanying rupture of the choroid and those in which there is not, and he regards the myopia and the rupture to the choroid as being less and worse degrees of a similar injury. Whatever view one takes of the precise explanation of the peculiar situation and form of the choroidal rupture—and there are several different opinions on this small matter—they all must take as their starting-point the difference in the elasticity of choroid and sclerotic. A blow, then, which has not been sufficient to cause rupture of the choroid, may yet have had power enough to force in the anterior surface of the globe, and cause the eyeball to expand in the only situation in which the mechanical condition of affairs can permit expansion, namely, anterior to the cone of muscles. [The present writer does not feel so confident as M. Bouchart that distension of the part within the cone of muscles is impossible.] At all events, this is the portion of the globe to which least support is given by the adnexa or outside agencies. This distension must cause a relaxation of the suspensory ligament, and consequent adoption by the lens of a condition of greater convexity than it possesses under normal tension; as the sclerotic slowly regains its customary dimensions, the normal relation of parts returns, the tension of the suspensory ligament becomes firmer, and the lens flatter. In this connection it is interesting to note that when a choroidal rupture is examined after a few days, it is frequently found to be slightly narrower than when first formed, a fact which would also be explained by the return of the distended sclerotic to its normal form and dimensions.

Along with this traumatic myopia there is often interference with the action of the pupil and ciliary muscle. The latter is natural enough, for either a spasmodic contraction might be set up by the irritation, caused by the shaking about to which the lens has been subjected by the force of the blow, or, if the impact has been more severe and the lens even partially freed from the control of the suspensory ligament, contraction of the ciliary muscle would produce no effect upon it, and instead of a spasm of accommodation we should see total loss of accommodative power. One might naturally enough suppose that dilatation would be the most likely alteration present in the pupil, but this is not so; on the contrary, it is generally contracted. At the same time the tension is as a rule lowered.—*Rec. d'opht.*, Paris, January 1901.

SENILE CHANGES AT THE MARGIN OF THE CORNEA.

WITH the arcus senilis every one is familiar, that curious opaque line which forms just within the corneal margin as age advances; the condition to which Fuchs draws attention, and of which he describes in his paper four cases, is quite different, though the two were present at the same time, and are probably closely related. In this disease, or degeneration, there forms a furrow just within the corneal margin, with a gradual sloping edge peripherally, and an abrupt, steep margin centrally. This, according to Fuchs, is not an ulcer; the first process is the disappearance of Bowman's membrane over the implicated area, then the superficial lamellæ of the cornea gradually pass into a fibrous substance, probably chiefly by the solution of the cementing material which binds them together. In one case, in which he was able to examine the eye microscopically, Fuchs found a quantity of new-formed vessels at the floor of the furrow; the formation of these, he thinks, is probably the first step in the process. Arcus senilis itself consists in the deposit of a number of hyaline flakes in the superficial layers of the cornea. Fuchs draws an analogy between this condition and that known as band-shaped keratitis, that peculiar ribbon of opacity which stretches across the cornea, forming chiefly at the part most constantly exposed to the action of the air. Both are superficial and due to disturbed nutrition, though their distribution is entirely different. Leber considers the deposition of lime salts, which causes the ribbon opacity, to be due to evaporation in the rima palpebrarum, and it is possible that the hyaline deposit of arcus senilis may be due to the opposite state of affairs.—*Arch. f. Ophth.*, Leipzig, Bd. lii. S. 2.

RECOVERY FROM ALBUMINURIC RETINITIS.

EXCEPT in cases in which the retinitis albuminurica has occurred during pregnancy, this is extremely rare. Rochon-Duvigneaud recently reported to the French Society of Ophthalmology two cases which he had seen. The first was a woman whose symptoms began during pregnancy, but who afterwards had evident interstitial nephritis. At the end of a year there was nothing pathological to be seen in the fundus but a pale disc and a little extra pigmentation about the posterior pole. She died of pneumonia about eight years afterwards. The second case was that of a man of 32, who developed nephritis in the course of acute Bright's disease. He recovered, and the characteristic appearances in the fundus likewise cleared up, leaving pale discs and an irregular pigmented patch near the right macula. This was six years ago, and the patient is still in good health and able to read small print with his better eye. There has been a trace of albumin in the urine ever since the acute illness.—*Ophth. Rev.*, London, October 1901.

HETOL.

IN situations other than the eye, intramuscular or intravenous injection of hetol, as the cinnamate of sodium has been named, has proved to be of great value. When such an injection is made, there occur a free leucocytosis and an aseptic inflammation round any neighbouring mass of tubercle. Such a mass becomes penetrated by numbers of leucocytes, which also congregate thickly round it, and gradually gives place to solid connective tissue. It is naturally in the tuberculous affections of the eye that, following analogy, one would expect the substance to be most useful, but, according to Pflüger, its good offices are by no means limited to such conditions. He has employed it with advantage in herpes corneæ, although its action must be on the nerve terminations, and cannot be supposed to reach to the Gasserian ganglion or to the cells of the cord. For such a condition it is therefore only to be employed as an adjuvant to other measures. In certain deep ulcers of the cornea, in scleritis, in anterior uveitis, provided the cornea is also attacked, the treatment proved serviceable. Thus, in certain forms of interstitial keratitis, the duration of the disease seemed to be considerably shortened, but those cases of anterior uveitis in which the cornea escaped altogether did not appear to react well to the drug. Tuberculous kerato-uveitis was particularly amenable to treatment in this way, though so intractable to all other methods of attack.—*Arch. d'opht.*, Paris, July 1901.

SPECTACLES FOR IRIDEREMIA.

TOTAL congenital absence of the iris is a rare condition, but when present it is apt to cause great distress to the patient, on account of his inability to regulate the amount of light entering the eye, as one can do who has a normally acting pupil. When he passes out of a comparatively dark place into a brightly lighted one, he is therefore apt to feel discomfort from the sudden "blinding" effect of the entrance of so much light. To relieve this misfortune, Königshöfer of Stuttgart suggests the use of spectacles which, in addition to any necessary lens, are furnished with an apparatus exactly resembling the "iris diaphragm," with which many photographic lenses are supplied. This is, of course, duplicated, and the controlling rods are connected by a horizontal bar of very light construction, which passes across the lower part of the forehead. Matters are so arranged that when the "pupils" are medium in size the controlling rods point vertically upwards; should the patient pass into bright light he has merely to push the horizontal bar gently to the left, when both "pupils" at once and equally contract. Should he desire a larger pupil, he pushes the bar to the right. Königshöfer says the little apparatus has given great satisfaction to the patient for whose comfort he devised it. It could also be employed after iridectomy for any cause.—*Clin. opht.*, Paris, October 10, 1901.

REPORTS OF THE MEDICAL SOCIETIES.

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Edinburgh Medico-Chirurgical Society, *November* 6, 1901.—Mr. A. G. **Miller**, President, in the chair.—Dr. **Melville Dunlop** showed a case of chloroma.—Dr. **Norman Walker** showed three cases of lupus treated by the X-rays.—Mr. **Stiles** showed—(1) A girl after operation for plexiform neuroma of the scalp; (2) child after operation for tuberculous disease of the frontal bone; (3) skiagrams from a case of congenital dislocation of the hip.—Mr. **Alexis Thomson** showed a sarcoma of the small intestine, causing incomplete obstruction, and treated by two-stage enterectomy.—Mr. **Stiles** showed—(1) Calvarium of a child who suffered from multiple tuberculous osteomyelitis of the cranium; (2) hernial sac and strangulated testicle, removed from a child during operation for irreducible inguinal hernia; (3) sac of a hydrocele with constriction, corresponding to the external abdominal ring; (4) a needle removed from a child's abdomen.—Dr. **Harvey Littlejohn** showed—(1) A specimen of extraperitoneal rupture of the bladder, the result of a kick on the abdomen; (2) a heart much enlarged in the transverse diameter, with great dilatation of the pulmonary artery.—Dr. **Alexander Bruce** read a paper on the motor localisation in the lumbo-sacral region of the spinal cord. He said that Nissl was the first to point out the peculiar degeneration motor cells undergo when thrown out of action. In this degeneration the nucleus wanders to the periphery, and the protoplasm becomes finely granular. In the normal cord three main cell groups are to be found—the lateral, the postero-lateral which is the main group, and the post-postero-lateral. There are also smaller groups—the central, which increases as it goes down the cord; the mesial group, which disappears in the lower lumbar but reappears in the sacral segments. In a case of amputation above the knee, the cord was found to be normal above the fourth lumbar segment. Below that point the postero-lateral and the post-postero-lateral groups of cells were degenerated, the mesial and antero-lateral were normal. In a case of amputation of the foot alone, the post-postero-lateral group alone was affected. The foot and calf muscles are therefore probably supplied by the postero-lateral-post-postero-lateral groups. The second case examined was one of amputation of the hip with removal of the ilium. It was found that above the second and third lumbar segments some normal cells were present; at the fourth and fifth lumbar all the cells were degenerated; but at the first and second sacral some normal cells appeared in the antero-lateral group. These unaltered cells in the sacral segments are for the uninjured muscles, the obturators, and the gemelli. The degenerated cells high up are those for the high origin of the ilio-psoas. The centres for the hamstring and external rotators extend far down the cord close to the foot centre. The mesial group of the third and fourth sacral segments showed degeneration when the pudic nerve suffered injury, and is probably the centre for the levator ani and sphincter ani, and also for the muscles of the trunk as it reappears where the phrenic nerves are given off. Dr. Bruce hoped to further develop this subject as suitable material presented itself.—Dr. **Miller** then delivered a few valedictory remarks. He referred to the losses by death during the two years he had been president, and reviewed the work of the two sessions, mentioning that, of cases shown, those of nervous disease and of abdominal surgery were the most numerous, thus showing where the chief interest of the profession lay.

Edinburgh Obstetrical Society.—*Wednesday, November* 13, 1901.—Dr. **Milne Murray**, President, in the chair.—Dr. **Milne Murray**, the retiring President, delivered his valedictory address, which will appear in the next issue of this Journal.—Dr. **Berry Hart** read a paper on "The Nature of the Fleshy Mole." He first described the naked-eye structure of the fleshy mole, the clinical features, and the difficulties arising in diagnosis. The placental structure and the nature of the choriobasal septa and the basal serotina were then considered. Dr. Hart described the normal plugging which occurred in the serotinal veins, and held that this plugging was in excess in the fleshy mole, whose structure he stated was due to—(1) undue plugging of the serotinal sinuses, leading to engorgement of the maternal placental circulation; (2) tying down of the chorion, where the chorio-basal septa are attached, and thus the subchorionic bulgings. The death of the fœtus was secondary to this. Naked-eye and microscopic specimens were shown in proof of these points.

Glasgow Medico-Chirurgical Society.—*October* 18, 1901.—Dr. **R. O. Adamson** read notes of a case of peripheral thrombosis and cardio-pulmonary embolism, treated by large doses of ammonia. The patient, a gentleman æt. 70, complained one day of pain in the calf of the leg after exertion. A few days later he woke in the night feeling faint and breathless. The same thing occurred the following night; and in the morning the lips, cheeks, and finger-nails were cyanotic, and the least exertion caused great dyspnœa. Examination of the heart at the beginning of the illness showed the right border of the heart to be an inch from the right sternal margin, and the apex-beat in the normal position. No murmur was heard; but later, at the apex, a soft systolic murmur developed, which became harsher towards the tricuspid valve. There was some pitting and tenderness on pressure over the right tibia. The left leg was normal. Dr. Adamson explained the cardiac symptoms by the carriage of a detached embolus into the pulmonary artery, with secondary thrombosis spreading from it towards the heart. The treatment consisted mainly of large doses of ammonia. The patient made a slow recovery, which was ultimately aided by Schott's exercises and change of air.—Dr. **Henry Rutherford** read notes on two cases of hydrocele of the tunica vaginalis, treated by a new and simple procedure (Winkelmann's operation). The operation consisted in—(1) incision of the sac; (2) turning of it inside out, so as to prevent it closing over the testicle; (3) closure of the wound in the other tunics and skin of the scrotum; (4) using a local anæsthetic. Dr. Rutherford claimed for the operation that it was both rapid and safe.—Dr. **Freeland Fergus** described an operation for paralysis of the superior oblique muscle of the eye. The patient had been thrown from his bicycle, and found, on recovery, that he had, for certain directions of fixation, diplopia. Dr. Fergus came to the conclusion that the muscle affected was the right superior oblique. The diplopia was in the lower half of the field of fixation. When the patient walked with the head bent forwards, he had no diplopia, *i.e.*, while using the upper part of the field of binocular fixation. The treatment adopted was a considerable advancement of the right inferior rectus. The result of the operation was that the patient held his head erect when walking. Further, there was excellent binocular vision; it seemed to be defective only at an angle of some 20° below the horizontal plane of the eyes.

November 1, 1901.—Dr. **Hinshelwood** read a paper entitled "Four Cases of Word-Blindness." The first case was that of a man, æt. 34, who had an attack of complete aphasia, motor and sensory. The motor and auditory aphasia rapidly passed off, but the word-blindness persisted for some time. The patient knew four languages—English, French, Latin, and Greek; and it was found that the word-blindness was greatest in English, less in French, still less in Latin, and not at all in Greek. The patient gradually recovered his power of reading, and in about three months all trace of the word-blindness had disappeared. Dr. Hinshelwood thought that this case confirmed the view previously expressed, namely, that our past visual impressions are arranged in the visual memory centre, in the left angular gyrus, in definite and ordered groups. The degree and extent of the word-blindness will depend upon whether the lesion affects the whole or only a part of the visual memory centre. The second case was that of a man, æt. 57, who became word-blind without any other central symptom, except a right lateral homonymous hemianopsia. The third case was that of a man, æt. 60, who had an attack of aphasia, both motor and sensory. All the symptoms passed away except word-blindness, which persisted for some time. After five months, however, he had recovered his power of reading completely. After being able to read for two months he had several epileptiform convulsions, and again became completely word- and letter-blind. The fourth case was that of a woman, æt. 34, who, after an attack of unconsciousness, was found to have right hemiplegia and complete motor and sensory aphasia. The patient remained at the end of fourteen months completely word- and letter-blind. On Dr. Hinshelwood's recommendation, she began again to learn the letters of the alphabet and to read, by using a child's primer. After two months she is now able to read all the letters of the alphabet and words of one syllable. The case was of great interest, as showing what could be done in suitable cases by persevering efforts in re-educating the patients.—Dr. **Carstairs Douglas** read a short paper on the nitro-propiol test for sugar in urine, based on two hundred observations. Nitro-propiol heated with a grape-sugar and an alkali produces indigo blue. The glucose acts as a renducing agent. The test is carried out as follows: A small quantity of urine (15 minims of urine to 5 c.c. water) is boiled; the reagent is added and indigo blue appears. If there is little sugar the urine is cooled. Chloroform is then added, and carries the indigo to the bottom of the test-tube. To carry out the test efficiently the urine must be diluted, and the boiling must be thorough.—Dr. **Galt** described a new method of preserving museum specimens. The solution consists of sodium chloride, 5 per cent.; nitrate of potash, 1 per cent.; chloral hydrate, 1 per cent.; and water to 100 per cent.

Glasgow Pathological and Clinical Society.—*October* 14, 1901.—Mr. A. E. **Maylard**, Vice-President, in the chair.—Dr. R. S. **Thomson** and Dr. A. R. **Ferguson** described three cases of brain tumour, and showed preparations and microscopic sections from them. In the first case there were multiple "tuberculous tumours" in the cerebrum and cerebellum; in the second, a solitary nodule of the same nature in the corpus striatum; the third was a case of glio-sarcoma connected with the pituitary body. In the second case the symptoms pointed so strongly to lesion of the motor cortex that the patient was trephined, but the operation showed that the tumour could not be removed.—Dr. **James Carslaw** showed an example of syphilitic meningitis with a gummatous mass over the lower part of the right second frontal convolution. The features of the case were that convulsive attacks had occurred, with long intervals of good health between, for twenty years; and in the last the symptoms pointed definitely to the lesion being in the motor area of the cortex.—Dr. L. R. **Oswald** showed the brain from a case of true porencephaly, in which the third frontal convolution, the island of Reil, and the caudate nucleus were for the most part replaced by a thin-walled cyst communicating with the lateral ventricle.—Dr. J. **Walker Downie** and Dr. A. R. **Ferguson** showed specimens from a case of extremely rapid ulceration of the palate, fauces, and pharynx. The appearances had suggested secondary syphilis, but the condition proved to be round-celled sarcoma with metastatic tumours in the viscera. The patient was a man æt. 33.

November 11, 1901.—Mr. H. E. **Clark**, President, in the chair.—Dr. K. **Love** showed for Dr. Richmond (Paisley) and himself two cystic kidneys, from a case in which there was a history of the occurrence of a similar condition in several members of the family. The cases of two other members of the family (mother and sister) were spoken of by Dr. **Newman** and Dr. **Knox**, under whose care they had been.—Dr. J. **Crawford Renton** read notes of two cases of enterectomy of portions of the great intestine for malignant tumour.—Dr. **James** F. **Gemmill** demonstrated a specimen of ischiopagus tripus (human), with special reference to the structure of the composite limb, illustrating his description with specimens and lantern slides.—Mr. **Maylard** showed—(1) Specimens removed by operation—(*a*) renal calculi, (*b*) a combined urethral and vesical calculus; (2) As a card specimen, thirty-one loose bodies removed from a single knee-joint.

Forfarshire Medical Association.—*November* 1, 1901.—Professor **MacEwan** in the chair.—The **President** referred to the loss the Association had sustained by the deaths of Dr. J. W. Miller and Dr. Russell of Arbroath.—Professor **Chiene** delivered an address on the surgery of sixty years ago and the surgery of the present day. He referred to the great change that had taken place in the nature of the operations performed, in the methods employed, and in the severity of the operations performed nowadays as compared with sixty years ago. In passing he pointed out the dangers of catgut and the necessity of being careful in its use and having it properly sterilised. The enormous increase in the number of operations was shown from statistics taken from Syme's and Lister's operation book, and contrasting them with his own book of operations done in his own wards during the same number of months. The causes of death after operation, then, were shown to be largely due to blood poisoning, whereas now they were largely due to the severity of the operation. Professor Chiene then pointed out the direction of the advance which he thought might be made in the surgery of the present day, taking up the treatment of tubercle, syphilis, and cancer in this connection. In closing he hoped that what he had said might stimulate the work of their society. He pointed out that such a society should stimulate not depress the general practitioner, for he could take an interest in such work. Practice and science went side by side.

November 7, 1901.—Professor MACEWAN, President, in the chair.—Dr. M'GILLIVRAY showed a patient with unusual rotation of the eyeball, rotation on an antero-posterior axis.—The PRESIDENT showed a case of macroglossia.—Dr. HALLEY showed a patient with veldt sores.—Dr. BUIST gave notes of several cases illustrative of myomata, and showed the tumours removed from those he had operated on. Professor MacEwan spoke on the cases, and agreed with Dr. Buist that it was necessary in certain cases to operate, owing to the circumstances of the patient, and mentioned some cases of his own in illustration.—Dr. M'GILLIVRAY gave his views on the advantages of protargol in ophthalmic work. He used it in a solution of the strength of 10 per cent. in catarrhal conjunctivitis, ophthalmia neonatorum, gonorrheal conjunctivitis, etc., and recommended it as better than silver nitrate. He had found no bad effects result from using it. Mr. Greig spoke of its use in urethritis, but said he used it in a weaker solution, and also referred to the pain it caused if a strong solution were used from the commencement of treatment. The President referred to its use in bladder cases, in a strength of ½ to 4 per cent. solution.—Mr. GREIG spoke (1) of a case of hydrocele of four years' duration, and stated that the fluid which he had drawn off by tapping contained cholesterin crystals. He next read notes of two cases of ectopic testicle on which he had operated, one in a child, in which the testicle was behind the scrotum, the perineal form; the other in an adult, in which the testicle was in Scarpa's triangle. In both cases the ectopic testicle was on the right side, and in both he placed the testicle in the scrotum. In the latter case the testicle had to be drawn through the conjoined tendon before passing it into and fixing in the scrotum. In both cases the testicles were normal, and he questioned the necessity for removing all retained testis. He preferred the name retained testis to that of undescended testicles, and preferred the classification adopted by British authors to that of French authors. He considered the retrovesical class given by one French author difficult to explain.

OBITUARY.

ALEXANDER HUGHES BENNETT, M.D., F.R.C.P. (London).

THE younger generation of practitioners in Edinburgh can have no knowledge of ALEXANDER HUGHES BENNETT, who recently died in London, as he left Edinburgh more than thirty years ago, and bad health prevented his rising to the eminence to which his qualifications entitled him to aspire.

The only son of that distinguished physiologist and clinical teacher, the late Professor John Hughes Bennett of Edinburgh University, he received his early education and professional training in Edinburgh. He took his M.D. in 1872, when he gained a gold medal for his thesis "On the Physiological Action of Theine and its Allies." While a Resident in the old Royal Infirmary, he was elected Senior President of the Royal Medical Society, in whose hall his voice was often heard to advantage, as he was a clear and ready speaker.

He chose London as his field of work, and medicine as his specialty. He accordingly took the membership of the Royal College of Physicians in 1876, and was elected a Fellow in 1885.

He was appointed Assistant Physician to the Westminster Hospital, and, with a view to devoting himself to nervous diseases, he joined the staff of the Hospital for Epilepsy and Paralysis. As the result of this special work he published a "Treatise on Electro-diagnosis of Diseases of the Nervous System," and many papers on diseases of the nervous system appeared from his pen from time to time.

His health, however, could not stand the strain of practice, and at last, after many efforts to regain strength by foreign travel, he ultimately had to relinquish practice and settle down to the life of a confirmed invalid. His last appearance in public was this year, when his sister, Mrs. Cox, presented a physiological laboratory to the University of Edinburgh, in memory of her father, Professor Hughes Bennett. After the ceremony Bennett appeared at the luncheon given to the guests, and spoke with his wonted vigour, and many of his old friends expressed the opinion that he looked better than he had done for years. The end came rather suddenly three months after this, as the result of a septic abscess.

His remains were cremated, and interred in the same grave as his father in the Dean Cemetery, Edinburgh.

JOHN CONNEL, M.A., M.D., F.R.C.P.Ed. (Peebles).

WE regret to record the death of a widely known and highly esteemed country practitioner, Dr. JOHN CONNEL of Peebles, who died in Edinburgh on the 2nd of this month, after a short but painful illness, borne with great fortitude and characteristic philosophy.

A man of great culture, Connel took the degree of M.A. at St. Andrews, with first-class honours in classics. It is worthy of remark that the only other first-class honours man of the year was his brother, who distinguished himself in philosophy. After the usual course in Edinburgh, Connel took the degree of M.B. C.M., in 1867, and M.D. in 1873. He was also a Fellow of the Royal College of Physicians of Edinburgh.

Thirty-four years ago he succeeded the late Dr. Junor of Peebles, one of whose daughters he married, and at once stepped into a large practice. He was much loved by his patients, and was always up to date in his knowledge.

He served the community in other ways; he was for some years Chairman of the School Board, and was also one of the Honorary Sheriff-Substitutes of the County of Peebles.

His worth was well known to his professional brethren, and somewhat early in his career he was elected President of the Obstetrical Society of Edinburgh, to whose *Transactions* he contributed several practical papers of much value. The Harveian Society chose him as one of its Presidents, when he delivered a scholarly address on the "Life and Writings of Harvey."

In matters political and ecclesiastical, Connel held strong views, and had the courage of his opinions, which he could defend with a lucid and ready speech. He was a warm advocate of the temperance cause, and aided it much by his voice and pen.

The profession in Scotland is distinctly poorer by the death of John Connel, a fine specimen of a scholarly, upright, and courteous gentleman.

ROBERT BARBOUR M'KELVIE, M.D. (Oban).

IN the passing away of **ROBERT BARBOUR M'KELVIE**, the Western Highlands lose a conspicuous personality. Apparently in his usual health, and, as his friends believed, with many years of life before him, he was struck down by apoplexy on the morning of November 5.

Born in the Island of Arran, and sent to the Ayr Academy to school, he passed into the Glasgow University, and graduated M.D. in 1858. For two years he acted as Assistant, first at Ayr, and subsequently at Dalry. He then obtained the post of Medical Officer to the United Parishes of Appin and Lismore, and soon made his name a household word throughout the length and breadth of Lorn. The adjacent parishes of Ardchattan and Muckairn being vacant, he was offered the post of Medical Officer to them, and, by accepting it, at once more than doubled the area of his district.

It was at the time to him a proud fact and thought, and in later life a happy reflection, that, while he held these posts, his sway extended over a greater area than that held by any other parochial medical officer in Great Britain. His boundless energy here found full scope, and his great physical strength—though often taxed to the utmost—showed no sign of strain, while for fifteen years he held these posts.

His professional skill caused him to be frequently called upon for consultations by his colleagues in different parts of Argyllshire; and over the whole land of Lorn, and the island of Mull, he was constantly to be met with. In 1875 he succeeded the late Dr. Macgilvray, and settled at Oban. Here for twenty-six years he has been the principal medical figure. His long faithful services in the country insured his at once securing the most prominent position in town.

The hard life, the broken rest, and for nights together, when on long country journeys, often scarcely any rest at all; the constant exposure to all weathers, the prolonged fasts—"a glass of milk and a bite of oatcake at a wayside cottage," he would say, "often doing for breakfast, dinner, and supper";—all these were bound to tell upon the strongest constitution, and though he did seem to be made of iron, it left its mark upon him all too soon. For some time past it was noticed that his imposing figure was bending to the weight of years, that he was losing vigour, and, to those who knew him best, that he was becoming prematurely aged. It has carried him off before he has reached his sixty-fifth year. Yet his end was as he desired it might be. He never witnessed a sudden death without expressing the hope that that too might be the mode of his exit from this stage of life. He died, too, in harness. The night before his death he was visiting his patients, and only finished his day's work at 10.30 P.M.

He enriched Oban by presenting the M'Kelvie Isolation Hospital to the burgh, for the treatment of infectious diseases. He benefited his fellow-townsmen by innumerable acts of kindness and generosity, by friendly counsel, and by timely help in many ways. He was the friend of rich and poor alike, and perhaps his name will linger longest within the walls of the Lorn Combination Poorhouse, where for twenty-six years he was the devoted Medical Officer.

He possessed a wonderful facility for repeating anecdotes. He was never met but he had a good story to tell, brought to memory by the merest passing incident. He was a man of buoyant and robust spirit, and his genial welcome brought a ray of sunshine into every house he visited. No wonder his patients loved him, and less wonder still that on the 9th of November, when all that was mortal of him was laid in Pennyfair, the largest funeral Oban had ever witnessed was the one accorded to the good doctor, when he was laid to rest in that lovely spot overshadowed by the mountains and surrounded by the glens amongst which he had passed all the busy years of his vigorous manhood.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING OCTOBER 26, 1901; AND FOR THE YEAR FROM JANUARY 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean .	46°·6	[1] 160°	40°	2·9	25·4	83	1203	2°·7
		[2] 2232°	660°					
Observed	46°·1	[1] 168°	55°	2·2	22·1	94	1365	3°·3
		[2] 2399°	712°					
Difference	−0°·5	[1] + 8°	+15°	−0·7	−3·3	+11	+162	+0°·6
		[2] +167°	+52°					

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH, DUNDEE, ABERDEEN, AND LEITH), DURING OCTOBER, AND SINCE JANUARY 1, 1901. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1] 1,092	184·4	215	36·3	105	17·8	191	32·3	122	20·6
	[2] 11,389	192·1	2295	38·7	1079	18·2	2068	34·8	1311	22·1
Actual Deaths and Rate per 10,000	[1] 1,022	172·6	194	32·8	97	16·5	190	32·1	120	20·2
	[2] 11,349	191·5	2366	39·9	1127	19·0	1825	30·7	1285	21·7
Difference from Mean	[1] − 70	−11·8	−21	−3·5	− 8	−1·3	− 1	−0·2	− 2	−0·4
	[2] − 40	−0·6	+71	+1·2	+48	+0·8	−243	−4·1	−26	−0·4

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1899	[1] 87	14·8	29	4·9	76	12·9	104	17·5	55	9·3
	[2] 799	13·4	300	5·1	828	14·0	1136	19·1	523	8·82
Actual Deaths and Rate per 10,000	[1] 94	16·0	37	6·2	81	13·6	83	14·0	43	7·3
	[2] 871	14·6	332	5·6	862	14·5	1017	17·1	608	10·25
Difference from Mean	[1] + 7	+1·2	+ 8	+1·3	+ 5	+0·7	−21	−3·5	−12	−2·0
	[2] +72	+1·2	+32	+0·5	+34	+0·5	−119	−2·0	+85	+1·43

* NOTE.—The figures [1] denotes the data for October, [2] for year to date.

The four weeks ending on October 26, 1901, exhibit a slightly lower mean temperature for the East of Scotland district than the average; for this the second and fourth weeks were to blame, contributing 48° out of the recorded 55 day-degrees below 42° F., and only 63° out of 168° above that point. The rainfall was again deficient, the amount below normal constituting almost 25 per cent. of the latter. Hours of bright sunshine were considerably above the average; the daily variability of temperature increased.

The first ten months of the year present an increase in accumulated day-degrees of warmth reaching to 167°, or 7·4 per cent. over the average of late years; those of accumulated cold one of 52°, or 7·8 per cent. above the usual; leaving a balance in favour of increased warmth of 115°, or +0°·38 for each day. The shortage of rain now equals 12·9 per cent. of the average; or rather more than $\frac{1}{100}$ in. per diem; while roughly thirty-two minutes of bright sunshine in excess of the daily mean have been enjoyed since the beginning of the year.

The total number of deaths registered in the four large towns during October was more than 6 per cent. below the average; the separate causes of death under which decreases chiefly occurred were constitutional, circulatory, phthisis, and cancer. Increased values were returned for digestive, urinary, and pneumonic causes. Influenza was credited with eight deaths.

The total number of deaths from all causes during the past ten months is now slightly below the average, respiratory and phthisical diseases contributing largely to this result, their respective deficits forming 11·7 per cent. and 10·4 per cent. of the usual values. Cancer still yields an excess equal to 16·2 per cent.; digestive causes, 9 per cent.; and urinary, 10·6 per cent.

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MEDICAL EDUCATION IN THE UNITED KINGDOM.

I. Education in General.

Before describing the requirements imposed upon all those who desire to obtain a degree or diploma with the right to practise medicine and surgery, a word may well be said about the important questions—Which degree or diploma to work for? and which teaching institution to attend? There are three courses open to the aspirant to medical honours. He may enter a university which affords education as well as confers degrees; he may study at certain medical schools, and take his degree at a university which does not possess a teaching staff; or he may enter for one of the licences to practise granted by certain medical bodies. A university degree has certainly greater credit associated with it, but now that a minimum course of study, lasting for at least five years, and including a large number of compulsory classes, has been made obligatory upon all graduates and licentiates alike, the difference between the instruction provided by the universities and by the different medical schools is not so great as formerly.

The usual sum for the class and degree fees spread over the five years is about £150 to £160, when necessary extras are included. The table on the following page gives approximately the minimum cost of obtaining the different degrees and diplomas.

The fees at the different London hospitals can be compounded for by one or two payments, the sum of which is less than the total if paid by annual instalments. The curriculum for the London Colleges' diplomas costs from £110 to £158, exclusive of the examination fees. Several of the London Colleges give substantial rebatements to sons of registered medical men. If the London University M.B. course is taken, the cost is somewhat greater. The degrees of the Scottish Universities cost, with the examination fees, from £115 to £145; the licence of the Scottish Colleges, from £115 to £130.

Through the munificence of Mr. Andrew Carnegie, the cost of academic training has been lessened by the payment of the educational fees in the case of students of Scottish nationality, and also of those who have attended at any scholastic institution under the inspection of the Scotch Education Department, of whatever nationality, during at least two years after the age of 14, provided application be properly made for the same. Mr. Carnegie has given £2,000,000 as capital for a fund for this purpose, the interest to be employed as above, in the hope that only those who require help will apply, although no questions as to circumstances are asked from any claimant.

The Carnegie Trust for the Universities of Scotland is controlled by an Executive Committee, with chambers at 2 St. Andrew Square, Edinburgh. Forms of application, either for university or extra-mural students, may be obtained by writing to the Secretary at the above address. No official copy of regulations has as yet been issued.

Table I.—*The Approximate Cost of Curricula.*

	Diplomas.	Class Fees.	Examination Fees, etc.	Total.
1. TEACHING UNIVERSITIES.				
Edinburgh	M.B., Ch.B.	£115 0	£28 7	£143 7
Glasgow	M.B., Ch.B.	97 13	28 7	126 0
Aberdeen	M.B., Ch.B.	90 0	23 2	113 2
Dublin	B.A., M.B., B.Ch., B.A.O.	207 12	27 0	234 12
Durham	M.B.	115 0	26 0	141 0
"	M.B., B.S.	115 0	31 0	146 0
Victoria University	M.B., Ch.B.	138 6	17 0	155 6
Birmingham	M.B., B.Ch.	148 19	21 0	169 19
Oxford	B.A., B.M., B.Ch.	165 0	30 0	£165–£220
Cambridge	M.B., B.C.	150 0	20 0	£150–£200
2. NON-TEACHING UNIVERSITIES.				
London	M.B., B.S.	£150 0	£17 0	£167 0
Royal, Ireland	M.B., B.Ch., B.A.O.	145 0	17 0	162 0
3. LICENSING BODIES.				
Conjoint Scottish Qualification	L.R.C.P.E., L.R.C.S.E., and L.F.P.S.Glasg.	£90 0	£30 0	£120 0
Conjoint English Qualification	L.R.C.P. Lond., and M.R.C.S. Eng.	£90–£120	36 15	£126–£156
Society of Apothecaries	L.S.A.	£90 0	15 0	£105 0
Conjoint Irish Qualification	L.R.C.P.I., and L.R.C.S.I.	135 0	42 0	177 0
Apothecaries' Hall	L.A.H.	90 0	22 1	112 1

At the provincial medical schools in England the expenses for the London Colleges' diploma are—Owens College, Manchester, £115, 3s.; about the same sum at University College, Sheffield; £123 at University College, Bristol; £115, 10s. at the Yorkshire College, Leeds; £125 at the University College, Liverpool. For the London University degree, £25 will require to be added to cover the fees for classes necessary for the Preliminary Scientific Examination.

In Ireland, the Dublin University only confers the M.B., B.Ch., B.A.O. degree on Bachelors in Arts; the cost therefore is considerably higher than elsewhere. The expense incurred while working for the Irish diplomas comes to about £140 in Dublin, but is much less than this at any of the Queen's Colleges, whether at Belfast, Cork, or Galway. The degree of the Royal University of Ireland costs £165 at the Catholic University School of Medicine in Dublin; the diploma of the conjoint colleges, £166.

The fees for lectures and examinations, therefore, vary from about £115 to £200; and, adding the cost of books, instruments, and club subscriptions for the five years, say £30, and of maintenance during thirty-nine weeks each year, £300, we get a total expense, solely connected with the curriculum, of from £445 to £530. This estimate is the utmost minimum; in most cases a sum of £1000, or over it, will be spent in the five years.

II. THE REGULATIONS OF THE GENERAL MEDICAL COUNCIL, BINDING ON ALL THOSE ENTERING UPON THE FIVE YEARS' COURSE OF MEDICAL STUDY, CONSTITUTING THE MINIMUM COURSE ALLOWED FOR GRADUATION OR LICENCE.

A. *Preliminary Examination and Registration.*

Before any one can register as a medical student, from which the commencement of his five years' course is calculated, he must pass a preliminary examination in the subjects of general education, or an examination recognised by the General Medical Council as equivalent to it. (Cf. Table II., pp. iv.–vii.)

A preliminary examination certificate is only accepted by the Council as entitling to registration, provided that it certifies that all the required subjects have been passed at one and the same time.

The student now enters his name on the books of a university or college, receives a certificate to this effect, and forwards the certificate, along with that for the preliminary examination, and a form of application for registration in the books of the General Medical Council (to be obtained from the registrars of the Council), filled up according to the instructions printed on it, to the registrar of the Branch Council for the district in which his school is situated. If this is not done within *fifteen days* from the commencement of a session, the classes taken during that session will not be recognised as qualifying for graduation. (For the names and addresses of the registrars, see p. xxiii.)

B. *Professional Education.*

The student is now officially recognised as having commenced the professional study of medicine, and is required to spend at least five years over it, of which the last year must be devoted to clinical work. Before he can enter for any of the examinations, he must produce certificates, not only to show that he has attended the necessary classes, and paid the necessary fees, but that he has given satisfaction to his teachers by his conduct, and taken part in the class examinations held during the sessions. The minimum attendance on classes which constitutes an *annus medicus* is fixed at two courses of lectures during each session, or one course of lectures and hospital practice.

Graduates in Arts or Science of any university recognised by the Medical Council, who shall have spent a year in the study of physics, chemistry, and biology, and have passed an examination in these subjects for the degrees in question, shall be held to have completed the first of the five years of medical study.

TABLE II.—*List of Examining Bodies whose Examinations in General Education are recognised by the Medical Council as qualifying for Registration as Medical or Dental Student.*

Testimonials of proficiency granted by educational bodies, according to the subjoined list, will be accepted by the Council, which reserves the right to add to or take from the list.

A Degree in Arts of any university of the United Kingdom, or of the colonies, or of such other universities as may be specially recognised from time to time by the Medical Council, is considered a sufficient testimonial of proficiency.

I. UNIVERSITIES IN THE UNITED KINGDOM.

Universities of Oxford, Cambridge, and Durham :—

(1) Junior Local Examinations (certificate to include all the required subjects at one time).
(2) Senior Local Examinations (certificates to include the required subjects).
(3) Responsions (certificate to be supplemented by others showing that the required mathematical subjects have been passed). Oxford.
(4) Moderations (certificates to include the required subjects). Oxford.
(5) Final Examination for a Degree in Arts.
(6) Higher Local Examinations (certificates to include the required subjects). Cambridge.
(7) Previous Examination (certificates to include the required subjects). Cambridge.
(8) General Examination (certificates to include the required subjects). Cambridge.
(9) Examination for Certificate of Proficiency (certificate to include all the required subjects at one time). Durham.
(10) Preliminary Examination in Arts for Graduation in Medicine and Science (certificate to include the required subjects). Durham.

Universities of London, Birmingham, and Wales, and Victoria University:

(11) Matriculation Examination (certificate to include the required subjects). London.

(12) Final Examination for a Degree in Arts or Science. London, Wales, Victoria.
(13) Preliminary Examination (certificate to include all the required subjects at one time). Victoria.
(14) Entrance Examination in Arts (certificate to include all the required subjects at one time). Victoria.
(15) Matriculation Examination (certificate to include all the required subjects at one time). Birmingham, Wales. Birmingham also has 1, 2, 3, 7, *supra*.

Universities of Edinburgh, Aberdeen, Glasgow, and St. Andrews:
(16) Junior Local Examination (certificate to include all the required subjects at one time). Edinburgh and Aberdeen.
(17) Senior Local Examination (certificates to include the required subjects). Edinburgh and Aberdeen.
(18) Preliminary Examination for Graduation in Medicine and Surgery (certificate to include the required subjects).
(19) Preliminary Examination for Graduation in Arts or Science (certificate to include the required subjects).
(20) Final Examination for a Degree in Arts or Science.
(21) Final Examination for the Diploma of L.L.A. St. Andrews.

University of Dublin:
(22) Public Entrance Examination (certificate to include the required subjects).
(23) Examination for the First, Second, Third, or Fourth Year in Arts (certificate to be signed in the approved form by the medical registrar of the university).
(24) Final Examination for a Degree in Arts.

Royal University of Ireland:
(25) Matriculation Examination (certificate to include the required subjects).
(26) Final Examination for a Degree in Arts or Science.

Oxford and Cambridge Schools' Examination Board:
(27) Lower Certificate (to include all the required subjects at one time).
(28) Higher Certificate (certificates to include the required subjects).

II. MEDICAL LICENSING BODIES.

Royal Colleges of Physicians and Surgeons in Ireland:
(29) Preliminary Examination (certificate to include all the required subjects at one time).[1]

III. EDUCATIONAL BODIES OTHER THAN UNIVERSITIES.

College of Preceptors:
(30) Examination for a First-Class Certificate or Second-Class Certificate of First or Second Division (to include all the required subjects at one time).

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[1] Recommended to be discontinued.

(31) Preliminary Examination for Medical Students (certificate to include all the required subjects at one time).

Scotch Education Department:

(32) Examination for Lower Grade Leaving Certificate (to include all the required subjects at one time).

(33) Examinations for Higher Grade or Honours Leaving Certificate (to include the required subjects).

Educational Institute of Scotland:

(34) Preliminary Medical Examination (certificate to include all the required subjects at one time).

Intermediate Educational Board of Ireland:

(35) Junior or Middle Grade Examination (certificate to include all the required subjects at one time).

(36) Senior Grade Examination (certificates to include the required subjects).

Central Welsh Board:

(37) Senior Certificate Examination.

IV. INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

Universities of Punjab, Allahabad, and Sydney:

(38) Entrance Examination.

Universities of Malta; Bombay; Madras; M'Gill College and Bishop's College, Montreal; Fredericton, New Brunswick; Toronto; Trinity and Victoria, Toronto; Queen's, Kingston; Western, Ontario; Mount Allison College, New Brunswick; King's College, Nova Scotia; Dalhousie, Halifax; Melbourne; Sydney: and Cape of Good Hope; and the Colleges of Quebec; Trinity, Toronto; Ontario; and New Brunswick:

(39) Matriculation Examination.

Ceylon Medical College; Universities of Manitoba, Otago, and New Zealand; and the Medical Boards of Nova Scotia and Newfound land:—

(40) Preliminary Examination.

Universities of Madras, Calcutta, Sydney, and Adelaide:

(41) First Examination in Arts.

Universities of Sydney, Adelaide, and Tasmania:

(42) Senior Public Examination.

Codrington College, Barbadoes:

(43) Arts Examinations at Durham University.

Continental Bodies:

(44) The German Abiturienten-Examen of the Gymnasia and Realgymnasia; Examinations entitling to the French Diplomas of Bachelier ès Lettres and Bachelier ès Sciences, and other corresponding Entrance Examinations to the Universities.

Egyptian Government:
(45) Secondary Education Certificate.

(*a*) No certificate from the bodies in the foregoing section (IV.) is accepted unless it shows that the examination has been conducted by or under the authority of the body granting it, includes all the subjects required by the General Medical Council, and states that all the subjects of examination have been passed in at one time; and copies of the form of the required certificate are supplied by the registrar of the Council for the purpose.

(*b*) In the case of natives of India or other Oriental countries whose vernacular is other than English, an examination in a classic Oriental language may be accepted instead of an examination in Latin.

The Subjects in which Courses are required of all Candidates by the General Medical Council.

In every course of professional study and examinations, the following subjects must be contained:—

(1) Physics, including the elementary mechanics of solids and fluids, and the rudiments of heat, light, and electricity.
(2) Chemistry, including the principles of the science, and the details which bear on the study of medicine.
(3) Elementary biology.
(4) Anatomy.
(5) Physiology.
(6) Materia medica and pharmacy.
(7) Pathology.
(8) Therapeutics.
(9) Medicine, including medical anatomy and clinical medicine.
(10) Surgery, including surgical anatomy and clinical surgery.
(11) Midwifery, including diseases peculiar to women and to newborn children.
(12) Theory and practice of vaccination.
(13) Forensic medicine.
(14) Hygiene.
(15) Mental disease.

It is to be understood, as regards the above-mentioned subjects, that the Council offers no opinion as to the manner in which the subjects should be combined or distributed for purposes of teaching or examination.

TABLE III.—*Details of the Curriculum required by the various*

(Minimum Age in all, 21 years ;

	Length of Compulsory Study at Institution giving Degree.	SUBJECTS OF COURSES REQUIRED, Chemistry.	Practical Chemistry.	Botany.	Zoology.	Physics.	Practical Physics.	Anatomy.	Practical Anatomy.	Physiology.	Practical Physiology.	Practical Histology.	Materia Medica and Therapeutics.	Practical Pharmacy.	Pathology.	Practical Pathology.	Post-mortems.
SCOTLAND.	Years																
M.B., Ch.B. Universities of Edinburgh, Glasgow, Aberdeen, St. Andrews	2	6	3	3	3	3	..	6	12	6	3	..	6	25 mtgs. or 3 mths.	6	3	3 mths. 30 sect. 25 sect. Course
L.R.C.P. and L.R.C.S.Ed. ; and L.F.P.S.Glasg. ; and the Scotch Colleges . .	..	6	3	..	3	3	..	6	12	6	..	..	3	3	3	..	3
ENGLAND.																	
London University, M.B. " " B.S.	..	C.	C.	..	C.	C.	..	6	12	6	..	..	C.	C.	C.	..	C.
Durham University, M.B. " " B.S.	1	6	3	..	3	3	3	12	12	6	3	3	3	3	3	..	25 (sect.)
Victoria University, M.B. " " B.S.	2	6	3	..	4	6	3	6	15	6	C.	..	9	C.	6	C.	12
Birmingham University, M.B. " " B.Ch.	4	6	3	..	6	6	3	9	9	6	3	..	9	3	6	3	12 mths.
Universities of (Oxford[1] M.B.) (Cambridge B.C.)	(6) (3)	C.	C.	..	C.	Course		C.	6	6	..	..	C.	C.	C.	..	C.
L.R.C.P.Lond. ; and M.R.C.S. Eng., London Colleges .	..	C.	C.	..	C.	6	..	6	12	C.	6		3	3	3		12
L.S.A. London, Society of Apothecaries . . .	..	6	3	..	3	..	..	6	12	6	3	..	6	3	3	..	C.
IRELAND.																	
Dublin University, B.A. M.B., B.Ch., B.A.O. . . .	4	6	3	3	3	C.	..	6	12	12	..	3	3	..	6	3	3
Royal University, Dublin, M.B., B.Ch., B.A.O. . .	..	6	3	3	3	3		12	12	12	3	..	3	3	3	3	6 (sect.)
L.R.C.P.I. and L.R.C.S.I., Irish Colleges . . .	..	6	3	..	3	3	..	6	12	6	..	3	3	3 or 3 yrs. apprentice.	..	..	30 mtgs.)

Figures represent months unless

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[1] The Oxford degrees are only conferred on those holding the B.A. degree of the University ; the details of the

niversities and Licensing Bodies for Degrees or Diplomas.

ength of Course, 5 years.)

WITH LENGTH OF ATTENDANCE.

and Public Health.	Medicine.	Clinical Medicine.	Surgery.	Clinical Surgery.	Operative Surgery.	Regional Anatomy.	Midwifery and Diseases of Women.	Diseases of Women.	Labour Cases, or Practical Midwifery.	Hospital Practice.	Dispensary.	Mental Diseases.	Infectious diseases.	Ophthalmology.	Diseases of Children, or Laryngology.	Clerk and Dresser in Hospital.		Vaccination.
										Years		Meetings.				Med.	Surg	
3	6	9	6	9	C.	..	6	..	12 cases or 3 mths. and 6 cases	3	6	16 16 C. C.	12 10 3 mths. C.	24 20 3 mths. C.	18 (optional) 3 mths.	6	6	.
3	6	0	6	9	..	..	3	..	20 cases or 3 mths. and 6 cases	2	6	13	13	13	..	Certificate.		
												Mths.	Months.	Months				
ourse.	6	24	6	24	.. C.	.. ..	C.	..	20 cases	4	6	2	2	..	..	..	..	.
C.	12	18	12	18	.. C.	.. C.	3	..	20 "	4	..	3	20 cases	..	..	6	6	Certificate.
3	12	24	6	24	.. 6	.. ..	6	3	20 "	2	..	C.	C.	..	..	6	6	
6	12	18	12	18	3	3	6	3	20 "	3	..	3	3	3	..	6	6	
C.	6	C.	6	C.	C.	..	C.	..	20 "	3	..	C.	3	..	..	6	6	
3	6	9	6	9	C.	..	3	12 mtgs.	20 "	2	6	C.	C.	3	..	6	6	
3	6	9	6	9	3	..	6	..	20 "	3	..	3	3	3		6	6	
										Mths.								
..	6	27	6	27	3	6	6	..	6 mths. 30 cases	27	..	3	C.	3	..	..	..	1
3	6	33	6	33	24 mtgs.	..	6	..	6 mths. 20 cases	33	..	3	10 cases and 3 mths.	3	..	3	3	10 mtgs.
..	6	27	6	27	30 mtgs.	..	6	..	6 mths. 30 cases	27	..	3	C.	3		..	..	Certificate.

otherwise stated. C. = Course.

curriculum required differ in many respects from the others, and may be obtained from the University Authorities.

TABLE IV.—*Table of Universities, Medical Schools and Institutions, with the Dates for Preliminary Examinations and Sessions,* 1901–1902.

		Preliminary or Matriculation Examination.	Sessions.		
			Winter.	Spring.	Summer.
ENGLAND AND WALES.					
London University		Jan. June.	..	..	..
The Royal College of Physicians, London; and Surgeons, England		Oct. April. (Coll. of Preceptors.) Jan. July.	..	..	..
London Hospitals	Guy's	As in last two.	Oct. 1.	..	Beginning of May.
	St. Bartholomew's		" 1.	..	"
	St. Mary's		" 1.	..	"
	Westminster		" 1.	..	"
	London		" 1.	..	"
	Middlesex		" 1.	..	"
	St. George's		" 1.	..	..
	Charing Cross		" 2.	..	"
	St. Thomas's		" 2.	..	"
	King's		" 1.	..	..
	University		" 1.	..	..
PROVINCIAL.					
Durham University		Sept. 17, Jan., March.	" 1.	..	"
Victoria University	University College, Liverpool	June and September.	" 1.	..	"
	Owens College, Manchester		" 1.	..	"
	Yorkshire College, Leeds		" 1.	..	"
University of Birmingham		April 15.	" 1.	..	"
University College, Bristol		June and September.	" 1.	..	"
Sheffield School of Medicine		" "	" 1.	..	..
Universities of Wales	University College, Bangor	Local Examinations by College of Preceptors, etc.	" 1.	..	..
	" " Cardiff		" 7.	..	..
	" " Aberystwyth	..	..	..	..
SCOTLAND.					
Universities of	Edinburgh	Sept. 27. March 25.	Oct. 15.	..	May.
	Glasgow		" 17.	..	April 23.
	Aberdeen		" 15.	..	..
	St. Andrews		" 1.	..	..
Edinburgh School of Medicine		Sept. 27. March 28.	" 15.	..	May.
University College, Dundee		Sept. 17. March 28.	" 10.	..	April.
St. Mungo's College, Glasgow		Sept. 17, April, July.	" 17.	..	"
Anderson's College, Glasgow			" 17.	..	"
IRELAND.					
Dublin University		(B.A. Degree.)	" 10.	..	May.
Royal University of Ireland		Sept. 25. June.	..	..	..
Conjoint Colleges		" March.	" 1.	..	April.
Catholic University		" "	..	..	..
Queen's Colleges	Galway	Oct., Nov. ..	Oct 15.	..	May.
	Cork	"	" 15.	..	"
	Belfast	" ..	" 15.	..	"

C. SINGLE QUALIFICATIONS NOT CONFERRING IN THEMSELVES THE RIGHT TO REGISTER.

Many of the colleges confer degrees or diplomas on members of the profession who already possess a registrable qualification. The M.B. of London and Durham Universities allows the holder to practise, while the examination for M.B. at Oxford and Cambridge is the same as that for B.C.

Owing to the limited space at our disposal, it is impossible to enter into any details as to the conditions under which these degrees and diplomas are given, especially as they appertain to graduates who hardly require information about them. All the universities confer degrees of Doctor of Medicine and Master in Surgery on their graduates, only imposing as a condition that a longer or shorter interval shall elapse between graduation and the grant of the higher degree. Generally, the candidate has to present an original essay or thesis, and in some instances to pass a clinical examination.

At Cambridge University the M.D. degree may be taken three years after M.B., B.C. two years after M.C. The London and Durham M.D. and M.S. are conferred on M.B. and B.S. graduates respectively, after two years have elapsed; the equivalent degrees of the Victoria University, after one year. At the Scotch Universities the degrees of M.D. or Ch.M. are granted after two years' practice or one year's hospital or research work, if the candidate be 24 years old. Both the Irish Universities require three years to elapse.

Royal Colleges.

The Royal College of Physicians of London grants the membership to university graduates or to its licentiates after an examination, fee £42. Recipients must have attained the age of 25 years. The Royal College of Surgeons of England grants its fellowships to persons of or above 25 years of age, who have been five years in practice, and who must pass the membership examination before the second examination for the higher degree. Fee, if a member, £15, 15s.; if not, £31, 10s. Similarly, the Scottish corporations grant single licences to persons of either sex who already hold a recognised qualification—the Royal College of Physicians, Edinburgh, to those with a surgical; the Royal College of Surgeons, Edinburgh, and the Faculty in Glasgow, to those with a medical qualification. The fee in each case is £15, 15s.

The Royal College of Physicians, Edinburgh, confers its membership on licentiates of the college, and graduates of universities of the United Kingdom, after attaining 24 years, on examination. Fee for licentiate, £15, 15s.; for others, £31, 10s. The fellowship is conferred by election on members, aged 25, of two years' standing. Fee, £56, 10s.

An examination is required of candidates for the Fellowship of the Royal College of Surgeons, who must be 25 years of age, and registered practitioners of two years' standing. Fee for licentiates, £30; for others, £45. Similar regulations apply to the Fellowship of the Faculty of Physicians and Surgeons of Glasgow, but 24 is the minimum age. The fees are different, if the candidate desires to qualify for holding office or not; £50 or £30 for non-licentiates, £15 or £25 for licentiates.

The Royal College of Physicians of Ireland grants licences in medicine and in midwifery to registered practitioners, a membership diploma to licentiates 25 years of age, of three years' standing, and to practitioners of seven years' standing or University B.A.s., after one year's possession of the licence. Fee, £21 (£15, 15s. to graduates in Arts).

The Royal College of Surgeons in Ireland retains the right of deciding whether candidates for the Fellowship shall be admitted to examination or not. Licentiates or graduates in surgery of less than ten years' standing have to pass two examinations; fees, £26, 5s. for licentiates of the college, £42 for others. When of more than two years' standing they have only one examination; fees, £26, 5s. and £42, as before.

Further information with regard to these qualifications can be obtained from the secretaries of the different colleges. A list containing their names and addresses will be found below (p. xxii.).

POST-GRADUATE COURSES.

In London, Edinburgh, Dublin, Cambridge, regular post-graduate classes are now held, although, when compared with the classes for graduates carried on in connection with many of the continental medical schools, they still leave much to be desired, both in arrangement and in the zeal shown by those who might be expected to support them more warmly. At most of the infirmaries and hospitals throughout the kingdom, in which clinical teaching is recognised, graduates can attend either on the same terms as undergraduates or at special rates.

Nine of the London Schools of Medicine have lately combined in a scheme for the better provision of post-graduate clinical teaching; a fee of £7, 7s. or of £10, 10s., enabling practitioners to attend the clinical instruction, the operations and autopsies, for three or six months respectively, at any one of these nine hospitals.

In May 1899, a London Medical Graduates College and Polyclinic was opened at 22 Chenies Street, Gower Street, W.C., at which consultations in various branches of medicine and surgery are held daily, except on Saturdays; clinical lectures are given, and practical classes conducted. An annual subscription of £1, 1s. admits the subscriber to the consultations and lectures. The fees for special courses vary from £1, 1s. to £5, 5s. The ordinary work of the College began on 3rd September; the practical classes will commence on the 17th.

Both in London and Liverpool Schools of Tropical Medicine have been established, at which graduates can study at first hand the diseases special to tropical countries. The London School commences the first of these annual courses on 1st October.

At Charing Cross Hospital special series of clinical lectures and practical demonstrations, exclusively arranged for the convenience of practitioners and post-graduate students, are given by members of the staff throughout the year. The lectures for the year are arranged in three courses, each consisting of ten meetings, and lasting ten weeks.

In Cambridge, graduates of other universities are admitted as advanced students. They may for one or more terms pursue courses of advanced study or research, literary or scientific, under the direction of the University teachers, and may become members of certain colleges without fulfilling the same conditions as are imposed on junior students, their collegiate status being assimilated to that of students who have taken their first degree in the university.

In Edinburgh a number of classes open to post-graduates are carried on throughout the whole year:—Ophthalmology and Ophthalmoscopy; Laryngology and Diseases of the Throat, Nose, and Ear; Dermatology; Diseases of Children; Chest Diseases; and Gynæcology. A series of demonstrations of Modern Gastric Methods of Analysis and Treatment is available at any time on the request of a sufficient number of post-graduates desiring the course; while arrangements are from time to time made whereby these various classes may be attended as far as is possible, and according to demand concurrently. On such occasions special courses in advanced surgical anatomy, medical anatomy, electrical methods, sanitary practice, and other specialities are included.

Any graduate desirous of ascertaining the details of the various classes should apply to the Honorary Secretary, Post-Graduate Courses, Surgeons' Hall, Edinburgh, when a full syllabus will be forwarded, or information supplied.

THE MEDICAL EDUCATION OF WOMEN.

A number of qualifications are now open to men and women alike. The degrees of the London and Durham Universities in England, of the Royal University of Ireland, and of the four Scotch Universities, may be conferred on women; who also may be granted the conjoint diplomas of the Scotch and Irish Boards, and the licence of the Society of Apothecaries, London.

The conditions for the qualification of women are practically the same as those for men. The University of Edinburgh, however, does not recognise attendance on mixed classes without sufficient reason shown.

The secretaries of the different schools, from whom prospectuses and any information required may be obtained, are as follows:—

London School of Medicine for Women—Miss Douie, 30 Handel Street, Brunswick Square, W.C.
Newcastle School of Medicine (Durham University)—Secretary, Durham University.
Medical College for Women, Minto House, Edinburgh—Miss H. F. Mackay.
Queen Margaret's College, Glasgow—Miss Galloway.

Royal College of Surgeons, Ireland (rooms in connection with the college are set apart for the use of female students)—I. F. Blake, Registrar.

The tables given below show the different degrees and diplomas open to women, the recognised schools, and the approximate cost of the class and college fees.

TABLE V.—*Degrees and Diplomas open to Women.*

University Degrees.	Diplomas.
London. Durham. The Royal, Ireland. The Four Scotch Universities.	1. *Conferring Qualification to Practise.* The Triple Qualification of the Royal Colleges, Scotland. The Conjoint Qualification of the Royal Colleges, Ireland. The Society of Apothecaries, London. 2. *Not conferring Qualification.* Licence of the Royal College of Surgeons, Edinburgh.

With the exception of two of the Scottish Universities, all these qualifications are given on the same conditions as to men. At Edinburgh and Glasgow Universities the compulsory two years' residence is allowed to be represented by residence at a recognised School for the Medical Teaching of Women.

TABLE VI.—*Medical Schools for Women.*

Name.	Cost of Curriculum and Fees.
London School of Medicine for Women, Brunswick Square	£125
College of Medicine, Newcastle-on-Tyne .	£146
Scottish Association, Edinburgh (qualifies for Edinburgh University)	(University), £128, 7s. (Colleges), £130
Queen Margaret College, Glasgow (qualifies for Glasgow University)	£129
Schools of Surgery of the Royal College of Surgeons, Ireland	(For College Degree), £165–£172.
Aberdeen and St. Andrews Universities (only first two years at St. Andrews).	
Dundee University College.	

PUBLIC HEALTH.

The Local Government Act, passed in 1888, provides that all medical officers of health of counties or districts with a population of 50,000 or more, must possess a diploma in public health, or must have been a medical officer of a district with 20,000 inhabitants for three consecutive years before 1892; or, before the passing of the aforesaid Act, have been for not less than three years a medical officer or inspector under the Local Government Board.

Qualifications in public health (sanitary science, sanitary medicine, State medicine) are therefore much more sought after than formerly. They do not carry a right to register, and are only conferred on candidates already possessed of a registrable qualification.

Certain regulations for candidates for diplomas in public health, designed to ensure "the possession of a distinctly high proficiency, scientific and practical, in all the branches of study which concern the public health," have been laid down by the General Medical Council. The Council now expects the following rules to be observed:—

Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended, during six months, practical instruction in a laboratory.

1. A period of not less than twelve months shall elapse between the attainment of a registrable qualification in medicine, surgery, and midwifery, and the admission of the candidate to any examination or any part thereof for a diploma in sanitary science, public health, or State medicine.

2. Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended during six months, practical instruction in a laboratory or laboratories, British or foreign, approved of by the body granting the diploma, in which chemistry, bacteriology, and the pathology of the diseases of animals transmissible to man are taught.

3. Of being at least 23 years of age on examination for Part I.

4. Every candidate for Part II. shall produce evidence that, during a period of six months after obtaining a registrable qualification, he has practically studied the duties of outdoor sanitary work—(*a*) In England and Wales, either under the medical officer of health of a county, or of a single sanitary district having, at the date of the last census, a population of not less than 50,000, or a medical officer of health, devoting his whole time to public health work; or (*b*) in Scotland or Ireland, under the medical officer of health of a county, or of one or more sanitary districts having at the date of the last census a population of not less than 30,000; or (*c*) under a medical officer of health who is also a teacher in the department of public health of a recognised medical school. The certificate of an assistant officer of health of a county or a large urban district may be accepted, provided the medical officer of health of the county or district consents to the assistant officer giving such instruction.

5. And of being at least 24 years of age.

⁂ Any candidate who shall produce evidence that he has himself held an appointment of medical officer of health, under conditions not requiring the possession of a special sanitary diploma, shall be exempt from this regulation.

6. Every candidate shall produce evidence that he has attended

the clinical practice of a hospital for infectious diseases, recognised by one of the licensing bodies; provided that such a course of instruction may have been taken as part of the curriculum for his registrable qualification in medicine, surgery, and midwifery.

⁂ The rules as to study shall not apply to medical practitioners registered, or entitled to be registered, on or before 1st January 1890.

Degrees and Diplomas.

DEGREES (FOR UNIVERSITY GRADUATES IN MEDICINE).

M.D. (State Medicine), London. (Two years' study required.)

B.Hy., Durham. (Three months' course in comparative pathology (lectures), etc.; must study at Newcastle School of Medicine.)

B.Sc., Birmingham. (Six months' laboratory course of hygienic chemistry; a course of bacteriology; six months' practical outdoor experience; attendance upon a fever hospital.)

B.Sc., Edinburgh. (Eight months' laboratory (five at Edinburgh University) courses in physics, geology, public health, sanitary engineering, and in mensuration and drawing required, as well as official regulations.)

D.Hy., Durham. (Earliest date, two years after B.Hy., spent as M.O.H. Essay sent in.)

D.Sc., Edinburgh. (Five years after B.Sc., Thesis and Examination.)

DIPLOMAS.

D.P.H.
- Durham University. (Regulations as for B.Hy., but need not be a University graduate, nor have studied at Newcastle.)
- Oxford University. (Must fulfil General Medical Council's conditions.)
- Cambridge University. (Do.)
- Victoria University. (As at Oxford.)
- Aberdeen University. (Fever hospital course, six months; if not M.B.Aberd., must attend some of the necessary classes.)
- Royal Colleges, London. (As at Cambridge.)
- Royal Colleges, Edinburgh and Glasgow. (As at Oxford.)

D.S.M., Dublin University. (Must be a graduate of the Universities of Dublin, Oxford, or Cambridge, or M.D.)

,, Royal Colleges, Ireland. (As at Oxford.)

D.S.Sc., Royal University, Ireland. (Only conferred on graduates of the University. Cf. p. 167 of Calendar.)

Medical practitioners who registered or were entitled to register before 1st January 1890 are admitted to the examination for the Durham D.P.H., under the same conditions as are noted above. Twenty-eight days' notice is required. Fee, £10, 10s. At Oxford and Cambridge Universities the diplomas in public health are granted to any registered person who, if he qualified before 1st January 1890, is not required to pursue a prescribed course of study. Similar regulations govern the examinations of the different colleges in the case of those who qualified prior to 1890.

The actual scope of the examinations as held at the different centres can be easily ascertained from the syllabuses and calendars to be obtained from the secretaries. The titles of the books best adapted for perusal in view of the examinations may be seen in the *British Medical Journal* for 31st August 1901.

Fees for examinations.—D.P.H.—£10, 10s., English, Scottish, and Irish Colleges; Durham, St. Andrews, and Victoria Universities: £5, London and Royal Irish Universities: £5, 5s., Aberdeen: £10, Oxford: £12, 12s., Cambridge.

B.Sc.—£6, 6s., Edinburgh; £10, Birmingham.

B.Hy.—£16, 16s., Durham.

Usual fee for six months' laboratory work, £10, 10s. to £21.

Institutions at which Laboratory Work and Classes for Public Health Curriculum can be taken.

LONDON.

St. Bartholomew's Hospital.—Inclusive fee, 20 guineas.

Charing Cross Hospital.—Inclusive fee, 20 guineas.

St. George's Hospital.—Inclusive fee, 20 guineas; for candidates registered before 1st January 1890, 12 guineas.

Guy's Hospital.—Inclusive fee for six months' course of laboratory instruction and lectures, 20 guineas.

King's College.—Fee includes all course necessary.

London Hospital.—Inclusive fee, 20 guineas; three months' course, 12 guineas.

St. Mary's Hospital.—Six months' course, inclusive fee, 12 guineas.

St. Thomas's Hospital.—Inclusive fee, 20 guineas; short course, 6 guineas.

University College.

PROVINCIAL.

Cambridge University.

Birmingham University.—Inclusive fee, 13 guineas.

University College, Liverpool.

Yorkshire College, Leeds.

University of Durham, College of Medicine, Newcastle-on-Tyne.

University College, Bristol.

IRELAND.

School of Physic, Dublin.

The Catholic University School of Medicine.

Royal College of Surgeons, Schools of Surgery, Dublin.

SCOTLAND.

University of Edinburgh.—Fees, winter session, 10 guineas; summer session, 6 guineas.

University of Glasgow.—Fee for course of instruction, 10 guineas.

University of Aberdeen.—Fee for course of instruction, 9 guineas.

St. Mungo's College, Glasgow.—Fees: winter session of lectures and six months' laboratory instruction, 12 guineas; summer session of lectures and three months' laboratory instruction, 6 guineas.

The Conjoint Board in Scotland.—Fee for six months' laboratory course, 18 guineas.

CLINICAL HOSPITALS.

There are a number of hospitals throughout the kingdom which may be attended for the purpose of clinical study, especially during the fifth year of the curriculum, and attendance at which is accepted by many of the licensing boards as part of the compulsory period for hospital work.

In *London*, in addition to the clinical hospitals attached to the medical schools, the conjoint board of the Royal Colleges of Physicians and Surgeons accept certificates of attendance during the fifth year of study, from the—Great Northern Central Hospital, 155 beds; West London Hospital, 175 beds, Fee, 5 guineas; The Hospital for Sick Children, Great Ormond Street, 186 beds, Fee, 3 guineas; East London Hospital for Children, 100 beds, Fee, 4 guineas; Royal London Ophthalmic Hospital, 100 beds, Fee, 5 guineas; Hospital for Consumption, Brompton, 321 beds, Fee, 8 guineas; City of London Hospital for Diseases of the Chest, 164 beds; National Hospital for the Paralysed, etc., Queen Square, 200 beds; Queen Charlotte's Lying-in Hospital, 1100 patients annually, Fee, 8 guineas for four weeks.

Fever hospitals and asylums.—The Metropolitan Fever Hospitals, Fee, £3, 3s., two months, £1, 1s. each additional month; Bethlem Royal Hospital, Lower Hall Asylum, Bow; Camberwell House Asylum, Bethnal.

THE PROVINCES.

Liverpool—Royal Southern, 200 beds, Fee, £26, 5s.[1]; Northern, 155 beds, Fee, £26, 5s.[1]; Eye and Ear Infirmary, Myrtle Street, 46 beds; Infirmary for Children, 83 beds, free.

Manchester—St. Mary's Hospital for Diseases of Women and Children, 55 beds, 3400 labours, Fee for necessary course, £2, 2s.

Newcastle-on-Tyne—Hospital for Sick Children, 60 beds, free.

Bath—Royal United Hospital, 130 beds.

Birmingham—Midland Hospital for Skin and Urinary Diseases, £5, 5s. for three months.

Bradford—Royal Infirmary, 230 beds, £10, 10s.[1]

Brighton—Sussex County Hospital, 190 beds, £21 for two years.

Derby—Derbyshire Royal Infirmary, 198 beds, £10, 10s. annually.

Devonport—Royal Albert Hospital, 88 beds, £2, 2s.

Hospitals in *Exeter*, *Gloucester*, £20 a year; *Lincoln*, £10, 10s.; *Norwich*, £15, 15s.; *Nottingham*, £10, 10s.; *Staffordshire*, £10, 10s.; *Winchester*, £21;[1] *Wolverhampton*, £21.[1]

SCOTLAND.

Edinburgh—Royal Infirmary, 790 beds, £12[1]; Victoria Hospital for Consumption, 15 beds, £2, 2s. for course; Royal Hospital for Sick Children, 119 beds, £2, 2s. for course; Eye, Ear, and Throat Infirmary, 6 beds, £1, 1s.; Royal Maternity, 40 beds, £2, 2s.; City Hospital for Infectious Diseases, 400 beds, £2, 2s.; Royal Asylum, Morningside, 700 beds, £2, 2s.

Glasgow—Royal Hospital for Sick Children, 80 beds, £1, 1s.; Western Infirmary, 400 beds, £21[1]; Eye Infirmary, £1, 1s.; Royal Infirmary, £21[1]; Maternity; Belvedere Fever Hospital; Lock Hospital.

Dundee—Royal Infirmary, 286 beds; Royal Asylum.

Aberdeen—Royal Infirmary, Fee, £6; Sick Children's Hospital.

IRELAND.

Dublin—Sir Patrick Dun's Hospital, £12, 12s;[1] Richmond, Whitworth, and Hardwicke Hospitals,[2] 312 beds; Richmond Asylum, 1200 beds; Adelaide Hospitals, 140 beds; City of Dublin Hospital; Jervis Street Hospital, £12, 12s. a year; Mater Misericordiæ Hospital,[2] 323 beds; Dr. Steeven's Hospital,[2] 200 beds, £10, 10s., three months; St. Vincent's Hospital, 160 beds; Meath Hospital,[2] 160 beds; Rotunda Hospital, 1700 labours intern, 1800 extern annually—Fee, for term, six months, £21, three months, £12, 12s., Extras, £10, 10s. and £6, 6s.; Cork Street Fever Hospital; Coombe Lying-in Hospital.

Belfast—The Royal, £20;[1] Maternity; Ophthalmic; Eye, Ear, and Throat Hospitals; and those for Diseases of Women, for Sick Children, and the District Asylum.

Cork—North (100 beds) and South (100 beds) Infirmaries; the Mercy, Cork Union, Lying-in, Maternity, Fever, Gynecological, and Ophthalmic and Aural Hospitals; and the Eglinton Asylum.

Galway—County Infirmary and Lower Hospital.

DENTAL SURGERY.

Licences to practise dentistry and to be registered are obtainable from the Royal College of Surgeons of England, of Edinburgh, and of Ireland, and from the Faculty of Physicians and Surgeons of Glasgow.

A large number of the medical teaching institutions provide special arrangements for dental students. A list of the majority of these is given on page xxii.

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[1] Perpetual.

[2] Contain beds for Fever patients.

REGULATIONS OF THE GENERAL MEDICAL COUNCIL.

Candidates for a diploma in dental surgery shall produce certificates of having been engaged during four years in professional studies, and of having received three years' instruction in mechanical dentistry from a registered practitioner. One year's *bonâ fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted one of the four years of professional study. The three years of instruction in mechanical dentistry, or any part of them, may be taken by the dental student, either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

A register of dental students is kept by the Registrar of the General Medical Council, 299 Oxford Street, London.

Preliminary education.—Dental students are subject to the same regulations as regards preliminary education as medical students, but professional study may commence by pupilage with a registered dental practitioner.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Licence in Dental Surgery.

The following are the regulations:—

I. There is a Preliminary Science Examination and two Professional Examinations for the licence. The Preliminary Science Examination consists of chemistry, physics, and practical chemistry, and is identical with Part I. of the First Examination of the Examining Board in England for medicine. The First Professional Examination for the licence consists of mechanical dentistry and dental metallurgy; and the Second, general anatomy and physiology, general surgery and pathology, dental anatomy and physiology, dental pathology and surgery, and practical dental surgery.

Candidates will be required to show a general knowledge of the anatomy of the whole human body.

II. Candidates will be required to produce certificates of having received instruction, at an institution recognised for the purpose, in chemistry, physics, and practical chemistry, before entering for the Preliminary Science Examination.

⁂ This instruction may be taken prior to the date of registration as a dental student.

III. Candidates will be required to produce the following certificates before entering for the First Professional Examination, namely:—

1. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of mechanical dentistry, under the instruction of a competent practitioner, or under the direction of the superintendent of the mechanical department of a recognised dental hospital, where the arrangements for teaching mechanical dentistry are satisfactory to the Board of Examiners in Dental Surgery. In the case of qualified surgeons, evidence of a period of not less than two instead of three years of such instruction will be sufficient.

⁂ This instruction may be taken prior to the date of registration as a dental student.

2. Of registration as a dental student by the General Medical Council.

3. Of having attended at a recognised dental hospital and school:

(*a*) A course of lectures on dental metallurgy.

(*b*) A course of practical dental metallurgy.

(*c*) A course of lectures on dental mechanics.

(*d*) A course of practical dental mechanics, including the manufacture and adjustment of six dentures and six crowns.

IV. Candidates will be required to produce the following certificates before entering for the Second Professional Examination, namely:—

1. Of having been engaged during four years in the acquirement of professional knowledge, subsequently to the date of registration as a dental student.

2. Of having attended at a recognised dental hospital and school:

(*a*) A course of dental anatomy and physiology.

(*b*) A separate course of dental histology, including the preparation of microscopical sections.

(*c*) A course of dental surgery.

(*d*) A separate course of practical dental surgery.

(*e*) A course of not less than five lectures on the surgery of the mouth.*

* These lectures may be given either at a recognised dental hospital and school, in which case the lecturer must be a qualified surgeon practising surgery, or they may be given at a recognised medical school, and may form part of the course required by Clause 8 (*d*).

3. Of having attended at a recognised dental hospital or in the dental department of a recognised general hospital, the practice of dental surgery during two years.

4. Of having attended at a recognised medical school:

(*a*) A course of lectures on anatomy.

(*b*) A course of lectures on physiology.

(*c*) A separate practical course of physiology.

(*d*) A course of lectures on surgery.

(*e*) A course of lectures on medicine.

5. Of having performed dissections at a recognised medical school during not less than twelve months.

6. Of having attended at a recognised hospital or hospitals, the practice of surgery and clinical lectures on surgery during two winter sessions.

7. Of being 21 years of age.

⁂ The certificates of professional study will be required to show that students have attended the courses of professional study to the satisfaction of their teachers.

V. Candidates may present themselves for the Preliminary Science Examination before entering at a dental school, on production of the certificates required under Section II. This examination will be identical with Part I. of the First Examination of the Examining Board in England.

VI. Candidates may present themselves for the First Professional Examination for the licence after the completion of six months' attendance at a recognised dental hospital and school, on production of the certificates required under Section III.

VII. Candidates may present themselves for the Second Professional Examination, on production of the certificates required under Section IV., after the completion of four years' professional study from the date of registration as a dental student, and after the lapse of not less than six months from the date of passing the First Professional Examination.

VIII. Synopses of the examination in chemistry, physics, and practical chemistry, and dental metallurgy, are issued with the regulations.

IX. The Preliminary Science Examination will be held in January, March or April, July and October in each year.

The First and Second Professional Examinations will be held in May and November in each year. Candidates are required to give twenty-one clear days' notice of their intention to present themselves for examination.

Special Exemptions.

A candidate who shall produce satisfactory evidence of having passed an examination for a degree in medicine, conducted at a university in the United Kingdom, in India, or in a British colony, on the subjects of the Preliminary Science Examination, will be exempt from that examination.

Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the examination in anatomy and physiology required for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in anatomy and physiology required for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in those subjects.

Candidates who are members of the college, or who have passed the examination in surgery of the Examining Board in England, or who shall produce evidence of having passed the examination in surgery for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in surgery for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in general surgery and pathology.

Fees to be paid by candidates, £21.

THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

Licence in Dental Surgery.

The candidate must fulfil the conditions of the regulations of the General Medical Council (see above); and the regulations as to curriculum are generally the same as those of the Royal College of Surgeons of England.

Special Exceptions.

Candidates who have passed the corresponding examinations for the Triple Qualification will be exempt from the First Dental Examination, and will have the advantage of being admissible either to the Final Dental Examination or to the Final Examination for the Triple

Qualification, or to both. But the First Dental Examination will not be held as equivalent to the Triple Examinations, and will admit to the Final Dental Examination only. Candidates who are licentiates of this college, or who may be registered medical practitioners, will require to produce certificates of attendance on the special subjects only, and will be examined in these only for the dental diploma. Any candidates who shall produce satisfactory evidence of having passed in any of the subjects of the First Dental Examination, before any dental or surgical licensing board recognised by the Royal College of Surgeons of Edinburgh, will be exempt from examination in such subject or subjects; but no examination will be recognised as giving exemption, unless it is coextensive in its scope with the examinations of this college, and is the only final examination on the subject or subjects required by the board at which it was passed.

Fees.—The fee for the diploma is £10, 10s. to those who began their studies before 1st October 1896; £15, 15s. to those who began after that date.

FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

The regulations as to certificates, curriculum, number of examinations, fees, and examinations are in effect similar to those of the Royal College of Surgeons of Edinburgh. There is special provision for candidates who intend to qualify both under the Medical and Dentists Act, and there is an examination in practical dentistry conducted in a dental hospital, and also a practical examination in mechanical dentistry.

THE ROYAL COLLEGE OF SURGEONS IN IRELAND.

Licence in Dentistry.

Candidates are required to pass three examinations, namely, Preliminary (in general education), Primary Dental, and Final Dental.

DENTAL TEACHING INSTITUTIONS.

London.

Dental Hospital of London and School of Dental Surgery, Leicester Square. Fee for dental course of two years, £50. Fee for general and hospital practice for two years, £55.

National Dental Hospital or College, Great Portland Street, W. Fee for necessary course, £42.

Guy's Hospital and London Hospital.

Provinces.

Mason University College, Birmingham. Composition fee, £73, 2s.

Liverpool Dental Hospital (University College). Composition fee, £73, 2s.

Bristol General Hospital.

Durham University and Newcastle School of Medicine.

University College, Bristol.

Owens College, Manchester.

Devon and Exeter Dental Hospital, Exeter.

Scotland.

Incorporated Edinburgh Dental Hospital and School. Minimum fee, £78, 13s.

Dental Hospital and School, Glasgow.

Dental Department, Royal Glasgow Infirmary.

Anderson's College, Glasgow.

Ireland.

School of the Royal College of Surgeons, Ireland.

Special composition fees are charged at several of the London hospitals for the classes required by dental students apart from those taken at a dental hospital. Thus, Charing Cross and Middlesex Hospitals, £56, 14s.; Westminster Hospital, £50; St. Thomas's, £65; St. George's, £50; King's College, hospital fee, two years, £25, 4s.; lectures, £15, 15s.

NAMES AND ADDRESSES OF THE SECRETARIES AND REGISTRARS OF CERTAIN OF THE MEDICAL SCHOOLS.

I. *Branch Registrars of the General Medical Council.*

England—Mr. H. E. Allen, B.A., LL.B., 299 Oxford Street, London, W.

Scotland—Mr. James Robertson, 54 George Square, Edinburgh.

Ireland—Mr. S. Wesley Wilson, 35 Dawson Street, Dublin.

II. *Secretaries and Registrars, etc., of Medical Bodies.*

The Secretary—English Conjoint Board, Victoria Embankment, London, W.C.

The Secretary—Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.

The Secretary—Apothecaries' Hall, Blackfriars, London, E.C.

The Secretary—University of Durham, College of Medicine, Newcastle-on-Tyne.

The Secretary—Royal College of Physicians, Edinburgh.

The Secretary—School of Medicine of the Royal Colleges, Edinburgh, 24 Forrest Road, Edinburgh.

The Secretary—Royal College of Surgeons, Edinburgh.

The Secretary—Anderson's College Medical School, Glasgow.

The Secretary—Educational Institute of Scotland, 40 Princes Street, Edinburgh.

The Secretary—Royal University of Ireland, Dublin.

The Registrar—Royal College of Physicians, Pall Mall East, London, S.W.

The Registrar—University of London, Burlington Gardens, London, W.

The Registrar—Mason University College, Birmingham.

The Dean of the Faculty of Medicine—In each of the Scotch Universities.

The Dean of the Faculty of Medicine—Victoria University, Owens College, Manchester.

The Secretary—Irish Conjoint Board, 6 Kildare Street, Dublin.

III. *Inspectors of Conjoint Examination in Scotland.*

Mr. James Robertson, 54 George Square, Edinburgh.
Mr. Alexander Duncan, B.A., 242 St. Vincent Street, Glasgow.

ARMY MEDICAL DEPARTMENT.

WAR OFFICE, LONDON.

*Schedule of Qualifications necessary for Candidates desirous of obtaining Commissions in the Army Medical Staff, with the Conditions of Service.**

QUALIFICATIONS.

1. A candidate for a commission in the Army Medical Staff must be 21 years and not over 28 years of age at the date of commencement of the competitive examination. He will be required to produce the following documents:—

(*a*) An extract from the register of his birth; or, if this is not obtainable, a declaration made before a magistrate by one of his parents or guardians, giving the date of his birth.

(*b*) A recommendation from a person of standing in society (not a member of his own family) to the effect that he is of regular and steady habits, and likely in *every* respect to prove creditable to the department, if a commission be granted.

(*c*) A certificate of moral character from the clergyman of the parish in which the candidate resides, if possible.

2. He must possess two diplomas or licences, recognised by the General Medical Council,—one to practise medicine and the other surgery, and must be registered under the Medical Act in force in the United Kingdom at the time of his appointment; but a candidate who holds a single diploma from the Society of Apothecaries, obtained under the conditions of the Medical Act of 1886, will be deemed to possess the double qualification required.

A candidate must also produce:—

(*a*) A certificate of having discharged the duties of a medical clinical clerk during six months, and of a surgical dresser during another six months, of which, in each case, not less than three months must have been spent in the wards of a hospital.

(*b*) A certificate of having attended a course of instruction during not less than three months at an ophthalmic hospital, or the ophthalmic department of a general hospital, which course shall include instruction in the errors of refraction.

3. The candidate must sign a declaration upon honour that he is of pure European descent, and that he labours under no mental or constitutional disease, no hereditary or personal tendency thereto, nor any imperfection or disability that can interfere with

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* As the regulations governing the Royal Army Medical Corps will shortly be recast throughout, the above can almost be regarded as obsolete.

the efficient discharge of the duties of a medical officer in any climate; also that he does not hold, and has never held, any commission or appointment in the public services.

4. His physical fitness will be determined by a board of medical officers, who are required to certify that his vision is sufficiently good to enable him to pass the tests laid down by regulations. The board must also certify that he is free from organic or other disease, and from constitutional weakness, or other disability of any kind likely to unfit him for military service in any climate.

Certificates of age, registration of diplomas, etc., and of character, must accompany the declaration when signed and returned.

5. A public and open competition will be held twice in the year for the admission of qualified candidates as probationers. The number of appointments so competed for will be not less than half of the number of vacancies which shall have arisen in the last completed half-year ending on the 30th June or 31st December. It will be competent for the Secretary of State for War to fill up the remaining number from such qualified candidates as may be proposed by the governing bodies of public schools of medicine in the United Kingdom, or in the Colonies, as he may think proper. Every candidate so proposed must be approved by the Director-General of the Army Medical Department, and be certified by the governing body proposing him to be duly qualified, according to a standard laid down by the Secretary of State.

The Secretary of State reserves the right of rejecting any candidate who may show a deficiency in his general education, as evinced by bad spelling or composition.

An entrance fee of £1 is required from each candidate admitted to the competition, and is payable at the conclusion of his physical examination, if pronounced fit.

6. The Secretary of State for War will from time to time fix the order of precedence and the proportion in which the several schools of medicine shall be offered the nomination of candidates.

7. A surgeon on probation will be required to pass through such course at the Army Medical School as the Secretary of State shall decide, and after passing a qualifying examination in the military medical subjects taught there, and satisfying the Director-General that he possesses the necessary skill, knowledge, and character for permanent appointment to the Army Medical Staff, he will be commissioned as surgeon-lieutenant.

The surgeons on probation who pass out of the Army Medical School at one qualifying examination will take precedence among each other as surgeon - lieutenants, as follows :—(*a*) Those appointed on nomination, according to their date of joining on probation; (*b*) those appointed by competition, according to the last day of the competitive examination, and in order of merit, as determined by the combined results of the competitive and qualifying examinations, with priority over any joining under paragraph (*a*) on the last day of the competitive examination. Their commissions will bear the date of the day of their passing out of the Army Medical School.

EXAMINATIONS.

Compulsory Subjects for the Entrance Examination.

1. Candidates will be examined by the Examining Board in the following compulsory subjects, and the highest number of marks attainable will be distributed as follows:—(*a*) Surgery, 1200; (*b*) medicine, including therapeutics and diseases of women and children, 1200; (*c*) anatomy and physiology, 600; (*d*) chemistry and pharmacy, and a practical knowledge of drugs, 600. No candidate shall be considered eligible for the medical staff who shall not have obtained at least *one-third* of the marks obtainable in each of the above *compulsory subjects*, and at least *one-half* of the aggregate of marks for all the compulsory subjects.

Voluntary Subjects for the Entrance Examination.

2. Candidates may be examined in the following voluntary subjects, for which the maximum number of marks obtainable will be:—Modern languages—French, German, and Hindustani, 200 marks each. Natural sciences—A candidate may not present himself for examination in more than two of the following subjects:—(*a*) Physics, 300; (*b*) zoology, 300; (*c*) geology and physical geography, 300; (*d*) botany, 300. A number less than one-third of the marks obtainable in each of these *voluntary subjects* will not be allowed to count in favour of the candidate who has qualified in the *compulsory subjects*. The knowledge of modern languages being considered of great importance, all intending competitors are urged to qualify in French and German.

The appointments announced for competition will be filled up from the list of qualified candidates, arranged in the order of merit, as finally determined by the total number of marks each has obtained in both the compulsory and voluntary subjects.

After passing this examination, every successful candidate will be required to attend one course of practical instruction at the Army Medical School as a surgeon on probation in—(1) Hygiene; (2) clinical and military medicine; (3) clinical and military surgery; (4) pathology of diseases and injuries incident to military service.

All surgeons on probation will be required to conform to such rules of discipline as the senate may from time to time enact, and provide themselves with uniform, namely, the regulation undress and mess uniform of a surgeon-lieutenant, including the serge jacket, but without the sword, sword-belt, dress trousers, and badge of rank.

They will be required to attend the Army Medical Staff mess at Netley, and to conform to the rules and regulations thereof.

Extracts from the Royal Warrant for Pay and Promotion, 1894, *as amended by Royal Warrant of* 18*th Sept.* 1894, *and from the Regulations for Army Medical Services,* 1894.

PAY.

The pay of the officers of our Army Medical Staff shall be at the following rates:—

		Exclusive of Allowances.		
Director-general of the Army Medical Department, at headquarters	(yearly)	£1500	0	0[1]
Surgeon-major-general	(daily)	2	15	0
At headquarters	(yearly)	1300	0	0[1]
Surgeon-colonel	(daily)	2	0	0
At headquarters	(yearly)	900	0	0[1]
Brigade-surgeon-lieutenant-colonel	(daily)	1	10	0
After 5 years in the rank	„	1	13	0
At headquarters	(yearly)	750	0	0[1]
Surgeon-lieutenant-colonel:—				
After 20 years' service	(daily)	1	5	0
„ 25 „	„	1	7	6
At headquarters	(yearly)	650	0	0[1]
Surgeon-major or surgeon-lieutenant-colonel	(daily)	1	0	0
After 15 years' service	„	1	2	6
At headquarters	(yearly)	650	0	0[1]
Surgeon-captain or surgeon-lieutenant	„	200	0	0
Surgeon-captain	„	200	0	0
After 5 years' service	„	250	0	0
„ 10 „	(daily)	0	15	0
Surgeon on probation	„	0	8	0

Quartermaster (daily) as a quartermaster of infantry (Arts. 187 and 191).

RETIRED PAY.

An officer of our Medical Staff, after completing ten years' service on full pay, may be permitted to retire from our army with retired pay or gratuity, according to the scale laid down in Art. 1071, if such voluntary retirement be specially recommended by our Commander-in-Chief, and approved by our Secretary of State.

The appointment of Director-General of the Army Medical Department shall be for seven years, and the retirement of the other officers of our Army Medical Staff shall be compulsory at the following ages, except that if it should in any particular case be considered desirable in the interests of the public service, the age for the retirement of a surgeon-major-general may be extended for a period not exceeding two years—surgeon-major-general and surgeon-colonel, 60 years; brigade-surgeon-lieutenant-colonel, surgeon-lieutenant-colonel, surgeon-major, surgeon-captain, and surgeon-lieutenant, 55 years.

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[1] Inclusive of allowances.

Rates.

Director-general, Army Medical Department:—	Yearly.		
After 7 years' service as director-general, and not less than 30 years' service in the department	£1125	0	0
After 5 years' service as director-general, and not less than 30 years' service in the department	1000	0	0
Under 5 years' service as director-general, if retiring on account of ill-health, and after not less than 30 years' service in the department	875	0	0
After 3 years' service as director-general, but with less than 30 years' service in the department, in addition to the retired pay of a surgeon-major-general	100	0	0
	Daily.		
Surgeon-major-general, on retirement under Art. 347, 457, or 458, or with 3 years' service as such,[1] if retiring voluntarily	£2	0	0
Surgeon-colonel, on retirement under Art. 347, 457, or 458, or with 3 years' service as such,[1] if retiring voluntarily	1	15	0
Brigade-surgeon-lieutenant-colonel, on retirement under Art. 347, 457, or 458, or with 3 years' service as such,[1] if retiring voluntarily:—			
Under 30 years' service	1	7	6
After 30 „	1	10	0
Surgeon-lieutenant-colonel:—			
After 20 years' service	1	0	0
„ 25 „	1	2	6
„ 30 „	1	5	0
Surgeon-major:—			
After 20 years' service	1	0	0
Surgeon-lieutenant-colonel, surgeon-major, surgeon-captain, or surgeon-lieutenant:—	Gratuity.		
After 10 years' service	£1250	0	0
„ 15 „	1800	0	0
„ 18 „	2500	0	0

An officer of our Army Medical Staff who, on voluntary retirement, has served for less than three years in the rank from which he retires, shall be only entitled to the gratuity or retired pay assigned to the next lower rank.[1]

Promotion.

A surgeon-lieutenant shall, if he be recommended by the Director-General, be promoted to the rank of surgeon-captain on completing three years' full-pay service.

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[1] The requirement of three years' service in the rank only applies, in the case of the medical staff, to officers promoted since the date of the warrant of August 26, 1889.

A surgeon-captain shall, if he be recommended by the Director-General, be promoted to the rank of surgeon-major on completing twelve years' full-pay service, including at least three years abroad.

A surgeon-major shall, if he be recommended by the Director-General, be promoted to the rank of surgeon-lieutenant-colonel, on completing twenty years' full-pay service.

A brigade-surgeon-lieutenant-colonel shall be selected, on the recommendation of our Commander-in-Chief, for ability and merit, from surgeon-lieutenant-colonels who have served abroad for at least eight years.

All promotions from the rank of brigade-surgeon-lieutenant-colonel to that of surgeon-colonel, and from the rank of surgeon-colonel to that of surgeon-major-general, shall be given for ability and merit, upon the selection of our Commander-in-Chief, with the approval of our Secretary of State; and the grounds of such selection shall be stated to us in writing. In all such cases the amount of service abroad shall be expressly stated.

On appointment as honorary physician or honorary surgeon to Her Majesty, under Article 345, an officer below the rank of surgeon-colonel shall, if duly qualified under Article 343, be promoted to that rank, and shall remain supernumerary of his rank until he would have attained the rank of surgeon-colonel in ordinary course.

An officer shall not be eligible for promotion to the rank of surgeon-colonel unless he has served at least ten years abroad, including three years in India.

Regulations for the Examination of Surgeon-Captains before Promotion to Surgeon-Major (Regulations for Army Medical Service, Appendix I.)

1. This examination is intended to test the progress and proficiency of a surgeon in all those branches of knowledge which are essential to his continued efficiency as a medical officer, and may be taken at any time after his seventh year of service.

The examination in medicine and surgery will be held by two gentlemen appointed by the Secretary of State; that in hygiene by the Professor of Hygiene, Army Medical School, Netley; and that in regulations, duties, military law, etc., by an administrative medical officer, nominated for the purpose by the Director-General.

2. The examination will embrace the following subjects:—(*a*) Surgery and surgical anatomy. (*b*) Medicine and pathology. (*c*) Hygiene, within the limits treated of in Parkes' "Practical Hygiene"; also the regulations regarding the sanitation of garrisons, quarters, hospitals, etc., as well as of camps and hospitals in the field, and of transports, troop, and hospital ships. (*d*) Duties of medical officers at home, abroad, and at sea, as defined in regulations; also hospital organisation and administration in peace and war, in-

cluding the transport of sick and wounded by land and sea. (*e*) The administration, interior economy, command, and discipline of the Medical Staff Corps, together with a knowledge of the principles of military law and their practical application (a certificate of proficiency in military law obtained at a garrison class will exempt the holder from examination in the latter).

3. A certificate will be required from a recognised teacher of surgery in any medical school, at home or abroad, in which operative surgery is taught, showing that the medical officer has gone satisfactorily through a complete course of operative surgery during the period within which the examination must be taken, and that he is a competent operator.

4. A report on any subject of a practical professional character, to be selected by the officer himself, and certified to be his own composition and in his own handwriting, will also be required. Considerable importance will be attached to the literary and scientific merits of this report, which must be furnished before the officer completes twelve years' service.

5. The examinations will be conducted by printed questions, which will enter so far into the subject-matter of each head selected for examination as to show that the officer's knowledge has been fully tested.

6. The questions and answers will be forwarded, under a sealed confidential cover, to the Director-General of the Army Medical Department, for transmission to the examiners, who will report to the Director-General as to the competence of the officer examined.

INDIAN MEDICAL SERVICE.

The regulations for the examination of candidates for admission to Her Majesty's Indian Medical Service differ only slightly from those of the home service. The declarations are sent to the Military Secretary, India Office, Westminster.

The physical fitness of each candidate will be determined previous to examination by a board of medical officers, who are required to certify that his vision is sufficiently good to enable him to perform any surgical operation without the aid of glasses. Further particulars as to the standard of eyesight will be found in a pamphlet by Sir J. Fayrer, M.D., K.C.S.I., entitled "Regulations as to Defects of Vision," published by Messrs. J. & A. Churchill, 7 Great Marlborough Street, W. A moderate degree of myopia will not be considered a disqualification, provided it does not necessitate the use of glasses during the performance of operations, and that no organic disease of the eyes exists. Every candidate must also be free from all other organic disease, and from constitutional weakness, or other disability likely to unfit him for military service in India. Candidates who pass the Medical Board Examination will be required to pay a fee of £1 before being permitted to compete.

Hindustani is included among the voluntary subjects, and candidates presenting themselves for examination in it are recommended to study some recognised text-book, such as the annotated edition of the "Taubut-un-Nasuk," which is the text used by candidates for the Indian Civil Service.

Course at Netley.—These courses will be of not less than four months' duration; but candidates who have already gone through a course at Netley, as candidates for the Army Medical Service, may, if thought desirable, be exempted from attending the School a second time.

At the conclusion of the course at Netley, and after the leaving examination, the position of the candidates on the lists of surgeon-lieutenants will be determined by the combined results of the Preliminary and Final Examinations, and, so far as the requirements of the service will permit, they will have the choice of commands in India (*i.e.* Bengal, Punjab, Madras, or Bombay) according to their position in that list.

Officers appointed to the Indian Medical Service will be placed on one list. Though ordinarily employed within the limits of the command to which they may have been posted, they will be liable to employment in any part of India, according to the exigencies of the service.

No candidate will be permitted to compete more than three times.

Examinations for admission to the service usually take place twice in the year, *i.e.* in February and August.

The examiners in London will prepare a list in order of merit, with the marks affixed in the different subjects, to be transmitted to the Director-General and communicated to the professors of the Army Medical School. If any candidate is found to be deficient in any particular subject, this shall be stated, in order that he may receive special instruction on the point at Netley.

PAY AND ALLOWANCE.

The following are the rates of "Indian pay and allowances" which will be drawn by officers hereafter appointed to the Indian Medical Service:—

Rank.	Years' Service.	Indian Pay and Allowances per mensem. When not holding an appointment carrying higher pay.		
		R.	A.	P.
Brigade-surgeon-lieutenant-colonel	25 and over	900	0	0
Surgeon-lieutenant-colonel .	,,	888	12	0
Surgeon-lieutenant-colonel .	20 ,,	852	3	7
Surgeon-major . . .	15 ,,	677	6	11
,, ...	12 ,,	640	14	6

		A. When not receiving any Staff Allowance.			*B.* When receiving Staff Allowance in addition.		
Rank.	Years' Service.	R.	A.	P.	R.	A.	P.
Surgeon-captain . .	10 and over	500	0	0	450	0	0
,, ,, . .	5 ,,	450	0	0	400	0	0
Surgeon-captain and surgeon-lieutenant	under 5	350	0	0	300	0	0

On first appointment they will only come into receipt of "Indian pay and allowances" (Column *A*) from the date of their arrival in India.

Officers holding the principal administrative appointments and substantive military charges of the Indian Medical Service receive at present the following consolidated salaries:—

		Rs. per mensem.	
Surgeon-major-general,	Bengal . . .	2700	
,,	Madras . . .	2500	
,,	Bombay . . .	2200	
Surgeon-colonel	from . . .	1800	
	to . . .	2250	
Brigade-surgeon-lieutenant-colonel of twenty years service and upwards		1100	with Rs. 90 horse allowance in cavalry regiments.
Surgeon-lieutenant-colonel, in substantive charge of a native regiment		1000	with Rs. 90 do.
Surgeon-major under twenty years' service in substantive charge of a native regiment .		800	with Rs. 90 do.
Surgeon-captain above five years' full pay service in substantive charge of a native regiment .		600	with Rs. 60 do.
Surgeon-captain or surgeon-lieutenant under five years' do. in substantive charge of a native regiment		450	with Rs. 60 do.

The salaries of other substantive medical appointments in the civil and military departments are consolidated, and vary from Rs. 1800 to Rs. 400 per mensem.

LEAVE RULES.

Officers of the Indian Medical Service, below the rank of surgeon-colonel, may be granted—(1) Privilege leave, under such regulations as may from time to time be in force; (2) leave out of India, for no longer period than one year, capable of extension to two years' absence from duty, on the following pay:—

After arrival in India, on first appointment	£200 a year.
After the commencement of the 5th year's service for pension . .	250 ,,
Do. do. 10th do. . .	300 ,,
Do. do. 15th do. . .	400 ,,
Do. do. 20th do. . .	450 ,,
Do. do. 25th do. . .	500 ,,

(3) Leave in India, but for the period of one year only, on full military pay and half the staff salary of appointment.

RETIRING PENSIONS AND HALF-PAY.

Officers of the Indian Medical Service will be allowed to retire on the following scale of pension, on completion of the required periods of service:—

After 30 years' service for pension	£700 per annum.
,, 25 ,, ,,	500 ,,
,, 20 ,, ,,	365 ,,
,, 17 ,, ,,	292 ,,

Officers not entitled to pension, when placed on temporary or permanent half-pay, will be granted the British rate of half-pay of their military rank as under:—

Rank.	Rates of Half-pay. Per diem.		Per annum.		
	s.	d.	£	s.	d.
Brigade-surgeon-lieutenant-colonel Surgeon-lieutenant-colonel	11	0	200	15	0
Surgeon-major	9	6	173	7	6
Surgeon-captain	7	0	127	15	0
Surgeon-lieutenant	3	0	54	15	0

Officers cannot retire *in India* on half-pay (No. 45, 28th February 1865).

Navy Medical Department.

The regulations for this service correspond very closely to those for the army, with the following exceptions:—

The candidate must also declare his readiness to engage for general service at home or abroad as required.

The official requirements in the natural sciences are as follows:—

Zoology.—The examination in zoology will include the general principles of biology and a comparison of animals with plants; the distinctive characters of the larger group of animals—the protozoa, cœlenterata, vermes, arthropoda, mollusca, echinodermata, and vertebrata—as illustrated by common types; the elements of embryology; animal parasites.

Botany.—The general principles of the morphology and physiology of low forms of life, for example, torula, bacteria, spirogyra, moss, fern; the general morphology of flowering plants; diagnosis of the important British natural orders; medicinal plants.

Physics.—The general principles of mathematics, acoustics, optics, heat, magnetism, and electricity, as: the properties of solids, liquids, and gases; conservation of energy, specific gravity, propagation and reflection of sound and light, temperature, specific and latent heat, thermometers, properties of mirrors and lenses, chromatic dispersion of light, forms of batteries, galvanic and frictional electricity, general properties of magnets.

Physical geography.—The relation of the earth to the rest of the solar system, nature of the earth's crust; the chief kinds of rocks, general configuration of land and water, mountains, plains, lakes, rivers, islands, glaciers and icebergs, the ocean currents, tides, the earth's atmosphere, winds and storms, dew, rain, climate, volcanoes, earthquakes, general distribution of animal and vegetable life.

Successful candidates, immediately after passing the examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in naval hygiene, etc., at Haslar Hospital.

PAY AND RANK.

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—on entry	0	11	6	209	17	6
,, after 4 years' full-pay service	0	13	6	246	7	6
,, ,, 8 ,, ,,	0	15	6	282	17	6
Staff-surgeon—on promotion	1	1	0	383	5	0
,, after 4 years' full-pay service in rank	1	4	0	438	0	0
Fleet-surgeon—on promotion	1	7	0	492	15	0
,, after 4 years' full-pay service in rank	1	10	0	547	10	0
,, ,, 8 ,, ,,	1	13	0	602	5	0
Deputy inspector-general	2	2	0	766	10	0
Inspector-general	2	15	0	1,003	15	0

On first appointment to the service, medical officers will receive full pay from date of appointment, but subject to the provisions of Art. 1342, Clause 2, of the Queen's Regulations, 1893.

The allowance of 5s. a day, in addition to full pay, at present granted to the fleet-surgeon of a flag ship, bearing the flag of a commander-in-chief on a foreign station, will be given to the senior medical officer, being a fleet- or staff-surgeon, and an allowance of 2s. 6d. a day to the senior medical officer, being a fleet- or staff-surgeon, of the ship of a commodore, or of a senior officer commanding a foreign station.

Medical officers conducting the course of instruction at Haslar Hospital will receive the following allowances:—

The senior officer employed upon this duty	£150 a year.
The junior officer assisting	50 a year.

The hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and light, are as follow:—

	At Home.	Abroad.
Inspectors-general of hospitals	£85	£130
Deputy inspectors-general	67	112
Fleet-surgeons and staff-surgeons	53	112
Surgeons	39	108

Medical officers serving afloat receive an allowance of 1s. 6d. a day in lieu of provisions, fuel and lights, as laid down in the Queen's Regulations. The travelling allowances, extra pay, lodging money, and compensation for losses, are fixed for naval medical officers according to their relative rank in the service.

HALF-PAY.

The undermentioned scale of half-pay is substituted for that hitherto in force:—

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—under 2 years' full-pay service	0	6	0	109	10	0
,, after 2 years' full-pay service	0	7	0	127	15	0
,, ,, 4 ,, ,,	0	8	0	146	0	0
,, ,, 6 ,, ,,	0	9	0	164	5	0
,, ,, 8 ,, ,,	0	10	0	182	10	0
,, ,, 10 ,, ,,	0	11	0	200	15	0
Staff-surgeon—on promotion	0	12	0	219	0	0
,, after 2 years' full-pay service in rank	0	13	0	237	5	0
,, ,, 4 ,, ,,	0	14	0	255	10	0
,, ,, 6 ,, ,,	0	15	0	273	15	0
Fleet-surgeon—on promotion	0	17	0	310	5	0
,, after 2 years' full-pay service in rank	0	18	0	328	10	0
,, ,, 4 ,, ,,	0	19	0	346	15	0
,, ,, 6 ,, ,,	1	0	0	365	0	0
Deputy inspector-general—on promotion	1	5	0	456	5	0
,, after 2 years' full-pay service in rank	1	7	0	492	15	0
,, ,, 4 ,, ,,	1	9	0	529	5	0
Inspector-general	1	18	0	693	10	0

PRISON MEDICAL SERVICE.

This branch presents limited opportunities, either for entrance, or for subsequent advancement. The smaller prisons are officered, as a rule, by local practitioners. The medical officers to the larger prisons are appointed by the Convict Prison Board, or the Prison Commission. Special forms may be obtained from the secretary of the latter at the Home Office, on which applications are to be made. In the Convict Service there are eight posts, with salaries ranging from £250 to £550; in the Local Prison Service twenty-eight officers, with salaries from £250 to £500.

COLONIAL SERVICES.

Applicants for posts under the Colonial Office must be between the ages of 23 and 30, be doubly qualified, and preferably have held hospital appointments. The usual certificates require to be shown, and an official medical examination undergone. Applications for posts or for information are to be sent to the assistant-secretary, Colonial Office. As a rule, about twelve to fifteen vacancies occur annually. In addition to these, a number of semi-official appointments are made yearly by this office, in connection with public works, etc., in the Colonies.

PRACTITIONERS ABROAD.

In the majority of the British Colonies local registration of legal British qualification suffices to allow a practitioner to pursue the duties of his profession. Only in two (cf. Table VII.)

is this unnecessary; while in one, Ontario, a local diploma must be gained after examination.

Few of the foreign nations allow British registered practitioners to practise, unless they first pass the State examinations. Table VII. gives a tabular view of the different regulations current:—

TABLE VII. COLONIES AND COUNTRIES IN WHICH DULY REGISTERED BRITISH GRADUATES AND DIPLOMATES CAN PRACTISE.

1. Without Compulsory Local Registration.

New South Wales, South Australia, Italy (only among visitors and aliens).

2. (*a*) After Local Registration.

Victoria, Tasmania, Queensland, New Zealand (£1, 5s. fee); Western Australia, Natal[1] (£1, 1s. to £3, 3s.); Cape Colony (£5 fee); Prince Edward Island ($20); New Brunswick ($1 to $2 a year); Nova Scotia, Quebec, Manitoba, North-West Territories ($50, and $1 to $2 a year); British Columbia, Jamaica, Klondyke ($50 fee); British Guiana, Fiji, Gold Coast, Gibraltar, Leeward and Virgin Islands, Monaco.

(*b*) After Application for Permission.

Belgium, Greece (examination in French or English); Italy.

3. Only after Examination.

State examination.—Austria, Denmark, Holland, Germany, Greece, Portugal, Roumania (*vivâ voce*), Russia, Norway, Spain, Sweden, Switzerland, Brazil (in French or Portuguese).

University or local examinations.—France, Turkey (£4, 10s. fee); Argentine (in Spanish); Chili (*vivâ voce*); Peru (*vivâ voce*); Uruguay (*vivâ voce*); Ontario.

4. America.

Twenty-four States require the passage of an examination; seventeen States require the same, or approval of the diploma presented by the applicant; and in nine, presentation of the diploma or degree is sufficient. The last nine are—

Alaska Territory, District of Columbia, Michigan, Arkansas, Kansas, Ohio, Arizona Territory, Nevada, Wyoming.

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[1] Annual licence also of £5.

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